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SUPREME COURT OF THE UNITED STATES.

No. 137.

HENRY A. BURR, ALBERT H. WRIGHT, AND JAMES M. RIBLET, APPELLANTS,

vs.

GEORGE E. COWPERTHWAITE AND ALVA B. TAYLOR.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE DISTRICT OF CONNECTICUT.

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U. S. Circuit Court, District of Connecticut.

H. A. BURR, ALBERT H. WRIGHT, and J. M. RIBLET, vs. GEORGE E. COWPERTHWAITE and ALVA B. TAYLOR. } In Equity.

Exhibits.

To the Judges of the Circuit Court of the United States for the District of Connecticut:

Henry A. Burr, Albert H. Wright, and James M. Riblet, of the city, county, and State of New York, and all citizens of the State of New York, bring this their bill against Alva B. Taylor
2 and George E. Cowperthwaite. And thereupon your orators complain and say that Henry Augustus Wells, of said city, county, and State of New York, and a citizen of said State of New York, heretofore, to wit, before the twenty-fifth day of April, in the year of our Lord one thousand eight hundred and forty-six, at the city, county, and State of New York aforesaid, invented new and useful improvements in the machinery for making fur hat bodies, and in the manufacture of hat bodies, of which said
3 improvements the said Henry Augustus Wells was then and there the original and first inventor, as your orators have been informed and severally believe and aver; and being such inventor of the said improvements, the said Henry Augustus Wells, with a view to obtain letters-patent therefor, entered a caveat in the Patent Office at the city of Washington on the ninth day of October, one thousand eight hundred and forty-four.

And your orators further show, that the said Henry Augustus Wells, being such inventor of the said improvements, made application to the Commissioner of Patents of the United States,
4 praying that letters-patent might be granted to him therefor, pursuant to the acts of Congress in such case provided.

And your orators further show, that the said Henry Augustus Wells, after having made the said application for letters-patent, and having executed a specification of his said invention, and filed the same in the Patent Office, at the city of Washington, preparatory to obtaining letters-patent therefor, did, on the fifth day of March, one thousand eight hundred and forty-six, execute in writing, under his hand and seal, an assignment and transfer
5 to Charles St. John of one undivided third share and interest of and in the said invention, and of the letters-patent to be obtained therefor, which said assignment and transfer was

duly recorded in the Patent Office at Washington, as by reference to said assignment, with the certificate of the receiving and recording thereof, made by the Commissioner of Patents, under the seal of the Patent Office, now in the possession of your orators, and
6 ready to be produced as this honorable court shall direct, or to a true copy thereof, hereto annexed in the schedule marked A, will more fully appear.

And your orators farther show, that in pursuance of the aforesaid application therefor letters-patent were issued to the said Henry Augustus Wells, under the seal of the Patent Office, whereby there was granted to the said Henry Augustus Wells, according to law, his heirs, administrators, or assigns, for the term of fourteen years from the date thereof, to wit, from the twenty-fifth day of April, in the year one thousand eight hundred and forty-six, the full and exclusive right and liberty of making, con-
7 structing, using, and vending to others to be used, the said improvements, a description whereof, in the words of the said Henry Augustus Wells himself, formed the schedule thereunto annexed, and making part of the said letters-patent.

And your orators further show, that after the issuing of the said letters-patent, to wit, on the twentieth day of April, in the year one thousand eight hundred and forty-six, the said Charles St. John executed under his hand and seal to your orator, Hen-
8 ry A. Burr, an assignment and transfer of one undivided ninth part, share, and interest of and in the said invention, and the aforesaid letters-patent granted therefor; and another and like assignment and transfer of one undivided ninth part or share thereof to one Alva B. Taylor, both of which last mentioned assignments were duly recorded in the Patent Office at the city of Washington, as by reference to said last mentioned assignments, with the respective certificates of the receiving and recording thereof, certified by the Commissioner of Patents, under the seal
9 of the Patent Office, now in the possession of your orators, ready to be produced as this court may direct, or to true copies thereof hereto annexed, marked C and D, will more fully appear.

And your orators further show, that on or about the twenty-second day of March, one thousand eight hundred and forty-eight, the said Henry A. Wells executed under his hand and seal, and delivered to one Merwin R. Brewer, an assignment and transfer of two undivided third parts or shares of and in the said invention, and the said letters-patent granted therefor, which assign-
10 ment was duly recorded in the Patent Office at the city of Washington, as by reference to the same, with the certificate of record thereof, made by the Commissioner of Patents under the seal of the Patent Office, now in *in* the possession of your orator, ready to be produced as this honorable court shall direct, or to

a true copy thereof hereto annexed, marked E, will more fully appear.

And your orators further show unto your honors, that afterward, and on the fifteenth day of December, A. D. 1848, the said
11 Merwin R. Brewer assigned, transferred, and set over unto Charles St. John, Henry A. Burr, and Alva B. Taylor, in common, the said two undivided third parts of the said letters-patent so assigned to him by said Henry Augustus Wells, whereby the entire interest in said letters-patent became vested in Charles St. John, Henry A. Burr, and the said Alva B. Taylor, in common, as by reference to said original assignment, duly recorded in the Patent Office, now in the possession of your orators, and
12 ready to be produced, or to a true copy thereof hereunto annexed, marked Exhibit F, will more fully apper.

And your orators further show unto your honors, that the said Charles St. John, Henry A. Burr, and Alva B. Taylor, being the owners in common of said letters-patent, put the same into extensive use, both by their own machinery and by licensing other parties to use the same, to the great advantage of the public, by reducing the cost of forming hat bodies considerably below the cost at which they could be formed at the time when said inven-
13 tion was first introduced to the public.

And your orators further show unto your honors, that shortly after the successful establishment of this new branch of manufactures under said patent certain parties in the city of Philadelphia, in the third circuit, commenced the manufacture of hat bodies substantially in the same manner as that described and specified by said Henry A. Wells in his said letters-patent; whereupon a bill was filed in the circuit court of the United States for the eastern district of Pennsylvania, in the April term of that court,
14 against Mead, Stichter, and others, who were thus infringing said letters-patent, praying an injunction and account; and the said court ordered issues to be tried by a jury to determine the questions of novelty, and patentability, and infringement, which issues came on for trial in said court in the month of May, A. D. 1850, before his honor Judge Kane, and resulted in a finding of the jury sustaining the validity of said letters-patent, and convicting the defendants of infringement, as by reference to the record thereof, now produced in court, will more fully appear.

And your orators further show unto your honors, that on
15 said trial the defendants pretended, and attempted to prove, that the said invention, patented by said Wells, was in substance and effect the same invention as was described and exhibited by drawings in the tenth volume of the London Journal of Arts and Sciences, and Repertory of Patent Inventions, by William Newton, London, England, third series, as the invention of one Thomas Robinson Williams, in England, anterior to the invention

of said Wells; but the plaintiffs, (one of whom was Alva B.
16 Taylor,) proved to the satisfaction of the jury, that not only was the invention of Wells different in principle and mode of operation from that described by Williams, but that a machine such as Williams' could not by any possibility manufacture a practically useful hat body of any material whatever: and more especially that the inventor of it never had any idea of making a fur hat body by the process of felting, but that his only attempt was to make forms by mixing cohesive compounds with some fibrous materials which had been delivered for that purpose from a carding ma-
17 chine. And the said defendants on said trial pretended and attempted to prove that said Williams had, by the exhibition of his machines, instructed said Wells how to make hat bodies by the use of a perforated cone and a vacuum; but the plaintiffs, (among whom was said Alva B. Taylor,) proved that said Wells, as early as the winter or spring of 1833 and 1834, before he had ever been in England, or seen Williams or his invention, had designed the invention which he afterward patented, and had described it to two persons, enjoining them to keep it a secret,
18 as he intended to work it out in practice at some future day. And the said plaintiffs on said trial also proved that when in England, the said Wells communicated his plans for making had bodies to his counsel there, and was advised not to make them known to Williams, but to return to this country, and to patent his invention here, and that he had acted upon such advice, and had perfected his invention in this country after his return from Europe.

And your orators further show unto your honors, that an
19 injunction was ordered by the circuit court of the United States for the eastern district of Pennsylvania, after the rendition of said verdict, restraining the defendants from violating said patents; and that in the circuit courts of the United States for the southern district of New York, and for the districts of Massachusetts and New Jersey, injunctions have been granted, restraining different defendants from making hat bodies by machinery substantially like that patented by said Wells, although the
20 machines differed in form, and in the manner in which they effected the object of guiding the fur to the cone.

And your orators further show unto your honors, that the said Alva B. Taylor, having thus established the validity of said letters patent, and having proved that said Wells was not indebted to said Williams for any information which had led to his invention, and that the invention of said Williams could not be used to produce a hat body, offered to your orator, Albert H. Wright, to sell his interest in said patent; and your orator, Albert H. Wright, having been connected with the business of working said
21 patent, and having known the facts which had been estab-

lished in respect to the invention of said Wells, finally agreed conjointly with your orator, James M. Riblet, to purchase the interest of said Alva B. Taylor in said patent for a large sum of money, and for a parcel of real estate in Newark, New Jersey, of which said Taylor already owned an undivided half interest, which was worth more than ten thousand dollars.

And your orators, Albert H. Wright and James M. Rib-
22 let, in pursuance of said agreement, did buy from the said Taylor his equal undivided third part of said letters patent, and paid a large price therefor, as by reference to the agreement between your orators, Albert H. Wright and James M. Riblet, and said Taylor, bearing date the 2d day of May, A. D. 1854, now in the possession of your orators, ready to be produced, and to the assignments to your orators by said Taylor of his interest in said patent, dated 2d day of May, A. D. 1854, and duly re-
23 corded in the Patent Office, or to true copies thereof hereunto annexed, will more fully appear.

And your orators further show unto your honors, that on the eighth day of November, A. D. 1856, the said Charles St. John assigned, transferred, and set over unto your orator, Henry A. Burr, his undivided third part of said letters patent, by an instrument in writing, bearing date that day, which was duly recorded in the Patent Office, as by reference to the said agreement, now here in court, with certificate of the Commissioner of Patents en-
24 dorsed thereon, or to a true copy thereof hereunto annexed, will more fully appear.

And your orators further show unto your honors, that in the original letters patent, granted to said Henry A. Wells, errors in the specification were incorporated, by reason whereof the said letters patent were inoperative to secure to the owners thereof the full benefits and advantages of the said invention; which errors arose from inadvertency, accident, or mistake, and without any fraudulent or deceptive intention on the part of the said Wells; wherefore your orators and Charles St. John, before the
25 thirtieth day of September, A. D. 1856, did surrender said letters patent to the Commissioner of Patents, in conformity with the statute in such case provided, and prayed a reissue thereof; whereupon such proceedings were had, that the said letters patent were issued thereon to them for the same inventions described in the said original letters patent, for the residue of the term then unexpired, for which the said original letters patent were granted, the first of which is entitled "A new and useful improvement in machinery for making hat bodies," and is dated on the
26 30th day of September, A. D. 1856, and the second is entitled "A new and useful improvement in manufacturing hat bodies," and is dated on the seventh day of October, A. D. 1856, as by reference to the said reissued letters patent, now in the

possession of your orators, and ready to be produced, or to true copies thereof hereunto annexed, making part of this bill of complaint, will more fully appear.

And your orators further show unto your honors, that the said defendants are using machinery, at Danbury, and within
27 the jurisdiction of this court, for the fabrication of fur hat bodies, substantially the same as that described and specified in the said letters patent, dated September 30th, 1856, and the improvement in manufacturing had bodies substantially the same as that described and specified in the said reissued letters patent, dated October 7th, 1856—that is to say, they use machines for the manufacture of hat bodies, in which the fur to compose the hat body is fed by an apron to a rapidly revolving brush
28 or picker, by which it is picked or separated, and thrown upon a perforated hollow cone, from which the air is exhausted, by means whereof the fur is distributed upon and confined to the surface of said cone in suitable quantities to form a hat body, as specified in the patent reissued September, 1856; and in the process of manufacturing the said body when so formed on the cone, they secure it thereupon substantially as claimed in the said renewed patent of October 1, 1856.

And your orators further show unto your honors, that the said George E. Cowperthwaite, on the 10th day of June, A. D.
29 1851, made an agreement with Charles St. John and Henry A. Burr, and with said Alva B. Taylor, who at that time was the joint owner of the patent, whereby he accepted a license under said patent, granted to said Wells as aforesaid, to use said machines in the States of Ohio, Kentucky, and Indiana, and did under said license run and use such machines, and continue to acknowledge the rights of your orators for a long time under said patents by paying tariffs, and accounting with your orators
30 for the use of said machines, until the month of November, A. D. 1854, when he sold the said license to William Dodd & Co., of Cincinnati, Ohio, together with the machinery he then had, for the sum of $15,000, whereof less than $3,000 was paid for the machinery, and more than $12,000 was paid to and received by said Cowperthwaite, as your orators are informed and believe, for the license of your orators to use said machines under said patent, and under a patent for an improvement thereon, owned by your orators as aforesaid.

And your orators further show unto your honors, that the said Cowperthwaite, on the 7th day of January, A. D. 1853,
31 took another license from Charles St. John and Henry A. Burr, and the said Alva B. Taylor, to use machines constructed according to said patent, in the States of Missouri and Illinois, which license said Cowperthwaite has since divided and sold in part for a price unknown to your orators, and another part

he still holds; as by reference to said original licenses, ready to be produced, will appear.

And your orators further show, that sometimes the said defendants pretend that in coming to the conclusion to engage in
32 the manufacturing of hat bodies on the plan aforesaid, adopted and used by them, and in the machinery and means aforesaid used by them at Danbury, within the jurisdiction of this court, in the State and district of Connecticut, they were encouraged so to do, and led to understand that the same would be right and lawful, and free from any infringement upon the patents aforesaid, now owned by your orators, by conversation with the complainant, Henry A. Burr, and other owners of the said patents; and that said Burr, before the defendants commenced or pre-
33 pared for said manufacture, told the defendants, and particularly said Cowperthwaite, that the Wells invention consisted only of the trunk with its hood, or peculiar delivery, and the dipping of the hat in hot water, and that the said Burr depended on said trunk to sustain said patent, and that the defendants, and particularly said Cowperthwaite, had conversations of like import with said Burr, and other owners of the Wells patent, frequently, when suits were pending on the Wells patent against alleged infringers, but your orators charge the contrary to
34 be true, and that all said pretences of the defendants are false. And your orators further say, that sometimes the defendants pretend that the complainant, Burr, has stated he did not believe that said Wells was the inventor of any important part of the improvement patented by him, but your orators charge the contrary to be true, and said pretence to be false.

And sometimes the said defendants pretend that the said method by them used is the same as that described by Williams, in the
35 tenth volume of Newton's said Journal; but your orators charge the contrary to be true, that such a method as Williams described could not make a hat body at all.

And sometimes the said defendants pretend that they did not obtain their knowledge how to make hat bodies from the invention of said Wells, but that they obtained it from the description of said Williams; but your orators charge the contrary to be true, and that, in the method described by said Williams, there is no mode described or exhibited by which the fibrous materials are guided to, or disbributed upon the cone, but the whole of the mate-
36 rial is permitted to fall simultaneously upon the cone placed upon a platform, so that no guide could be used if one had been contemplated, and the greater part of the material would fall upon the tips of the cones where it is not needed, and but little at the base where it is necessary; and that the improvement invented by Wells consists in throwing, guiding, and directing the fur, and depositing it on the cone in such thickness and quantity as the

operator may desire, as distinguished from a method of dropping the fur indiscriminately upon the cone, and catching only
37 so much of it as the exhausted cone might attract to itself.

And sometimes the defendants pretend that the invention of said Wells consists in a particular form of trunk or guide to conduct the fur from the brush to the cone; the contrary whereof your orators charge to be true, and that the form is immaterial, so long as the distinctive peculiarity, or principle, or mode of operation, which distinguishes the invention of Wells, is made available to the purpose of producing the result.

All which actings, doings, and pretences are contrary to
38 equity and good conscience, and tend to the manifest injury of your orators in the premises.

In consideration whereof, and forasmuch as your orators can have no adequate relief except in this court, to the end, therefore, that the said defendants may, upon their several and respective corporal oaths, and to the best of their knowledge, information, and belief, direct and perfect answer make to all the matters and things charged in this bill, and more particularly that they may answer and set forth:

1st. Whether they do not use machines such as described
39 for the purposes described; and if so, how many? and how many hat bodies they have formed thereon since the date of said reissued patent of September 30, 1856.

2d. Whether said Cowperthwaite was not the licensee under the original patent as aforesaid.

And that the defendants may answer the premises, and that they may be enjoined and restrained by an injunction issuing out of and under the seal of this court, from making, constructing, or using any machines, or any process of manufacture, such as they
40 are now using, or any such as are substantially the same as those invented by Wells, and patented to your orators as aforesaid; and that they may be decreed to account with, and pay over to, your orators the profits by them made; and that your orators may have such other and further relief as may be consistent with equity and good conscience.

May it please your honors, the premises considered, to grant unto your orators not only the writ of injunction issuing out of and under the seal of this honorable court, commanding and
41 restraining them from making, using, or vending to be used, any machines similar to those made by them as described in this bill of complaint, or from using the process of manufacturing hat bodies as aforesaid, but also a writ of subpœna issuing out of and under the seal of this court, commanding them to appear in a certain time and place in this court to answer the

premises, and to stand to and abide such orders and decrees as may be consistent with equity and justice.

42 And your orators, as in duty bound, will ever pray, etc.

H. A. BURR.

R. I. & C. R. INGERSOLL,
Solicitors.

UNITED STATES OF AMERICA,
District of New York, ss.

Henry A. Burr, being duly sworn, depose and say, that the matters and things set out in said bill of complaint, so far as they relate to his own acts and deeds, are true, and so far as they relate to the acts and deeds of others, he verily believes them to

43 be true. And he further says, that Henry A. Wells, the patentee of said improvements, is dead, and has been for several years; and that he verily believes him to have been the first and original inventor of the improvements patented by him in said letters patent.

H. A. BURR.

Sworn to before me this 26th November, 1856.

R. E. STILWELL,
U. S. Com.

(R. E. Stilwell duly certified as commissioner by Ken-

44 neth G. White, clerk C. C. southern dist. of New York.)

Reissue—No. 396.

United States of America, to all to whom these Letters Patent shall come:

Whereas Charles St. John, Henry A. Burr, Albert H. Wright and James M. Riblet, of New York, N. Y., assignees of Henry A. Wells, deceased, have alleged that said Wells did, in his

45 lifetime, invent a new and useful improvement in machinery for making hat bodies, (for which letters patent were issued to said Wells, dated 25th April, 1846; which letters having been surrendered by said assignees, the same have been cancelled and new letters ordered to be issued to them on an amended specification,) which said Wells stated had not been known or used before his application, he having made oath that he was a citizen of the United States; that he did verily believe that he was the original and first inventor or discoverer of the said improvement;

46 and that the same had not, to the best of his knowledge and belief, been previously known or used, said assignees having paid into the treasury of the United States the sum of fifteen dollars, and presented a petition to the Commissioner of Patents,

signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose.

These are, therefore, to grant, according to law, to the said Charles St. John, Henry A. Burr, Albert H. Wright and James M. Riblet, their heirs, administrators, or assigns, for the
47 term of fourteen years from the said twenty-fifth day of April, one thousand eight hundred and forty-six, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said assignees, in the schedule hereunto annexed, and is made a part of these presents.

In testimony whereof, I have caused these letters to be made patent, and the seal of the Patent Office has been hereunto
48 affixed.

Given under my hand at the city of Washington, this thirtieth day of September, in the year of our Lord one thou-
[L. S.] sand eight hundred and fifty-six, and of the independence of the United States of America the eighty-first.

Countersigned and sealed with the seal of the Patent Office.

GEO. C. WHITING,
Acting Secretary of the Interior.

49 C. MASON,
Commissioner of Patents.

The Schedule referred to in these Letters Patent, and making part of the same.

To all whom it may concern:

Be it known, that Henry A. Wells, late of the city, county, and State of New York, now deceased, did, in his lifetime, in-
50 vent certain new and useful improvements in the process of, and machinery for, making hat bodies of fur, for which said improvements letters patent of the United States were granted to the said Wells, bearing date the 25th day of April, 1846, of which the following is a full, clear, and exact description of the principle or character which distinguishes the said invention from all other things before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this description, in which
51 figure 1 is a plan of the machine; figure 2, a longitudinal, vertical section; and figure 3, a longitudinal elevation. The other figures will be described in their appropriate places. The same letters indicate like parts in all the figures.

It has long been essayed to make hat bodies by throwing the fibres of fur, wool, etc., by a brush or picker cylinder, on to a perforated cone, exhausted by a fan below, to carry and hold the fibres

thereon by the currents of air that rush from all directions
52 towards and through the apertures of the cone, and thus form a bat of fibres ready for hardening and felting; but from various causes all these attempts have failed. Hat bodies are required to be made thick at and near the rim, and thin along the crown and tip, that the required strength may be given where it is required, without making the hat too heavy, and at too great a cost of material. This disposition of the fur can be obtained by the skill and judgment of the workman by the hand process, known under the name of "bowing," but cannot by the
53 plan above referred to, for the reason that the fibres are only controlled by the currents induced through the apertures of the cone, or other form, by the exhaust, instead of being thrown, and properly directed for distribution, on to the cone or other form. When the fibres are not properly thrown and directed, but are drawn to the surface by the action of the exhaust, the force thus induced gradually decreases as the apertures in the cone are closed up by the accumulation of the fur deposited on the outer surface thereof, and in consequence the impelling force,
54 which carries the fibres, becomes insufficient to control the force of gravity, which will then prevail, and cause the fibres to accumulate to a greater thickness on the tip of the cone, where much less is required than below. And the said suggested plan cannot produce a practical result, for the further reason that there is no mode described by which the bat of fur fibres can be hardened while on the cone, that it may be removed from such cone preparatory to the after and well-known process of sizing or felting.

The invention of the said Henry A. Wells, by which the
55 required and much-desired practical result was obtained, consists in forming the bat of fur fibres by throwing the fur, in properly regulated quantities, against a section of the circumference of a perforated cone or other form, as the same is rotated, to present, in succession, every part of the circumference thereof to the current of impelled fur, and thereby obtain the required thickness of bat, when this is combined with the holding of the fibres on to the cone during the operation, by the pressure
56 of the surrounding atmosphere, induced by exhausting the air from them within the said perforated cone, or other form.

In the accompanying drawings (*a*) is a frame properly adapted to the operative parts of the machine, and (*b*) the lower feed apron, on which the stock is spread, by the attendant, in separate parcels, each sufficient for the formation of a hat, according to its intended weight. This apron, or endless belt of cloth, or other suitable material, passes around a roller (*c*) and a lip (*d*); the former at the back of the machine, with its bearings in sliding boxes

57 governed by set screws (*ee*) for the purpose of tightening the apron; and the latter near to the rotating-brush (*f*), and so formed as to present a slightly rounded edge for the apron to pass over where it presents the fur to the action of the brush. Instead of this slightly rounded edge, a small metallic roller may be substituted; but when this is done, the roller should be supported at different points between its end journals, and this he effected by letting it run in a circular groove in the lip, as represented in section at figure 4, where (*g*) indicates this roller. The fur, as it is carried along towards the lip (*d*), is gradually
58 compressed by the upper apron (b^1), which passes around a feed-roller (c^1), and lip (d^1), in manner similar to the under feed-apron. The roller (c^1) runs in a frame (*i*)—of which the lip (d^1) forms part—hung on journals that rest on standards (*j*), so that the lip (d^1) can be made to press on to the fur between it and the under lip (*d*), and thus gripe the fibres and present them to the effective action of the brush (*f*). The under plane of the upper apron (b^1) is inclined to the upper plane of the
59 lower one (*b*), the more effectually to present the fibres in the proper manner to the brush.

The roller (c^1) of the upper apron runs in sliding boxes, governed by set screws (e^1 e^1), and is placed forward of the journals of the frame, so that the tension of the belt (i^2), which communicates motion from the lower roller (*c*) to the upper one (c^1), may press the upper lip (d^1) on the under lip (*d*); but this may be effected by means of springs, weights, or other well known mechanical devices for making pressure under similar circumstances.

60 The fibres, as they pass from the feed-aprons, are acted upon by a brush (*f*) that rotates with great velocity, and which is composed of parallel rows of stiff bristles projecting from a cylinder, but which may be differently constructed and composed, if desired. As the fibres are first presented they are brushed and properly laid, by the dowward action of the brush, as indicated by the arrow, and when liberated are carried down the curved surface (*l*) of a chamber or tunnel (*m*); and at the lower edge of this they meet a current of air—that enters a narrow aperture
61 (*n*), near the bottom of the chamber, and extending the whole length of the brush—which being induced by the rotation of the brush and the partial vacuum in a perforated cone, prevents the fibres of fur from falling and resting on the bottom of the chamber, and carries them on to the perforated cone (*o*). This chamber extends over and under the brush and the forward part of the lips, and turns on the journals of the brush, or is otherwise so arranged as to have a slight motion, the axis of which is the same as that of the brush. Its bottom rests on a set screw (*p*) to regulate the delivery-end of the chamber relatively

to the cone. Its forward end, in addition to this, is provided with a hinged flap (q), regulated by a cam lever, as a means of regulating the delivery of the fibres. Its top (r) is gradually elevated and sides contracted to make the delivery-aperture nearly of the form of the cone, but narrower and higher; and its upper part is provided with a hood (s) so curved as to correspond generally with the curve of the tip of the cone. This hood is hinged to the upper part of the delivery-aperture of the chamber, and is connected with an eccentric (t) by means of a cord (u) and bell-crank (u^1) that passes over a pulley (r^{11}), so that each revolution of this eccentric carries the hood up and down to direct the discharge and distribute the fibres on to the cone—a greater thickness being desirable in the parts of the bat which form the brim than on the tip and crown; and when it is desired still further to diversify the distribution of the fibres, a cam can be substituted for the eccentric, and the connection between it and the hood is formed as represented in section at figure 5, where the cam (t) acts on a lever (t^1), connected with the hood (s) by the cord (u).

The cone (o) is made in the usual manner, but of thin sheet-metal, perforated, instead of wire-gauze. Its lower edge fits in a metallic ring (w), that runs in an appropriate collar in the upper part of a case (x), and its outer periphery is provided with cogs that mash into the cogs of a pinion (y)—concealed in the drawing by the pulley (d^2)—on a vertical shaft (z), by which a slow rotary motion is given to the cone, as the fibres are thrown on to it, to distribute them equally all around the cone. The case (x) is sufficiently long to receive two rings (w), one on each side of the pinion (y), by which both are kept in motion, and it—the case—is made to swivel on a hollow collar (f^1), to which its bottom is fitted, so that when one cone is covered it may be turned aside by turning the case half a revolution, and another cone put on to the other ring, that another bat may be in the process of forming, whilst the one already formed may be prepared for the hardening process in the manner to be hereafter described.

The case (x) communicates through the hollow collar (f^1), with an exhausting fan-blower (g^1), which consists of a vertical arbor (h^1), with oblique vanes (i^1), so that when rotating with great velocity in the direction of the arrow, the air is exhausted from the case (x), and the perforated cone (o). When one of the cones is removed from one of the rings (w), to be taken to the hardening apparatus, the aperture in the ring (w) must be closed up with a cap-plate (w^2) to prevent the access of air. Any other mode of exhausting the case and cone may be employed, but this is the most efficient which he (Wells) essayed.

The preparation of the formed bat for hardening is effected by

covering it with pieces of felt or fulled cloth just taken from hot water, and this is done in the following manner, namely: The attendant takes from a kettle of hot water a piece of felt cloth, rolled up on a roller, and applies one end of it to the surface of the bat, and as the cone rotates, the felt cloth winds from the roller on to the bat on the cone. Another piece of felt cloth is put on
68 the top, and then a strong perforated metallic cone (k^1)—see figure 6—is put over the whole, the more effectually to hold the fibres of the bat, and to make a slight pressure on them whilst it is immersed in hot water to harden. As the perforated cone (o) is better when made very thin, the pressure of the water when drawing it out of the kettle, after the bat has been hardened, tends to and would collapse it, and therefore to prevent this another perforated metallic cone (l^1)—see figure 7—is put inside (before the whole is immersed in hot water), to sustain the pressure in drawing the whole out of the hardening-kettle. The re-
69 lative situation of the three cones, the bat and the covering felt cloth, preparatory to the hardening process, is represented on an enlarged scale at figure 8, which is a vertical section through the whole. The inner sustaining cone may be dispensed with, if desired, by making the cone (o) of greater thickness and strength.

All the operative parts may be set in motion by any of the known means, such as belts, as fully represented in the accompanying drawings, in which (m^1) is a main line shaft overhead, driven by any first mover. From a wheel (n^1) on it a band (o^1) ex-
70 tends to a pulley (p^1) on the shaft of the brush, which should make about two thousand revolutions per minute, more or less. From another wheel (q^1), on this same shaft, a band (r^1) extends to a pulley (s^1), on the shaft of which there is a wheel (t^{11}) that drives the exhaust-fan (g^1) by the belt (u^{11}). And from a pulley (v^1) on the same line shaft a belt extends to a wheel (w^1), on the shaft of which there is a pulley (x), from which extends another belt (y^1) to a wheel (z^1) on the shaft (a^2), that carries the eccentric (t), to give all the reduced motions required for
71 the other parts of the machinery. From a wheel (b^2) on this shaft a belt (c^2) extends to a pulley (d^2) on the shaft (z) that rotates the cone (o). And another pulley (e^2) drives the wheel (f^2) of the feed-roller (c), by the belt (g^2), and on the other end of the axle of this feed-roller there is a pulley (h^2) which drives, by a cross-belt (i^2), the upper feed-roller (c^1). If desired, an alarm can be connected with the feed-roller of the lower apron to announce to the attendant when each charge of stock is
72 exhausted, that the cones may be shifted. This can be done by connecting the arbor of the feed-roller (c) of the lower feed-apron by a belt, with a wheel (k^2) provided with a cam or pin to lift, at every revolution, the hammer (l^2) of a bell (m^2), the striking of which shall give requisite indication.

It will be obvious from the foregoing, that the hood may be operated by hand instead of machinery, thus substituting the attention, skill, and cost of an operative for the positive regularity and cheapness of mechanical movements. It may be well to add, as a mere matter of precaution, that this invention is not
73 limited to the making of hat bodies, but to the making of bats on formers of any other shape or configuration, the form of the delivery aperture of the chamber and the hood, and the movements of the latter, being properly adapted to the change of form of the perforated mould or former, with the restrictions indicated.

Having thus described the mode of application of the said invention of the said Henry A. Wells, as the same was successfully reduced to practice by him, we do not wish to be understood as limiting the claim of invention to such mode of application,
74 as other modes may be devised, operating on the same principle, or having the same mode of operation, and only differing therefrom in the substitution of equivalent means.

What is claimed herein, as the invention of the said Henry A. Wells, deceased, is forming bats of fur fibres, by throwing the fur, in properly regulated quantities, substantially as herein described, against a section of the circumference of a perforated cone or other form, as the same is rotated, to present in succession every part of the circumference thereof to the current of impelled fur, to
75 obtain the required thickness of bat, substantially as described, in combination with the method of holding the fibres on to the cone, or other form, during the operation, substantially as described, and for the purpose specified.

CHARLES St. JOHN,
H. A. BURR,
A. H. WRIGHT,
JAMES M. RIBLET.

Wm. H. Bishop,
Chas. A. Wilson,
Witnesses.

76 Reissue—No. 400.

The United States of America, to all to whom these letters patent shall come:

Whereas Charles St. John, Henry A. Burr, Albert H. Wright, and James M. Riblet, of New York, N. Y., assignees of Henry A. Wells, deceased, have alleged that said Wells did, in his lifetime, invent a new and useful improvement in manufacturing hat bodies, (for which letters patent were issued to said Wells, dated
77 25th April, 1846, which letters having been surrendered by said assignees, the same have been cancelled, and separate

letters patent ordered to issue to them, on an amended specification,) which said Wells stated had not been known or used before his application, he having made oath that he was a citizen of the United States; that he did verily believe that he was the original and first inventor or discoverer of the said improvement, and that the same had not, to the best of his knowledge and belief, been previously known or used: said assignees having paid into
78 the treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose.

These are therefore to grant, according to law, to the said Charles St. John, Henry A. Burr, Albert H. Wright, and James M. Riblet, their heirs, administrators, or assigns, for the term of fourteen years from the said twenty-fifth day of April, one
79 thousand eight hundred and forty-six, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said assignees, in the schedule hereunto annexed, and is made a part of these presents.

In testimony whereof, I have caused these letters to be made patent, and the seal of the Patent Office has been hereunto affixed.

Given under my hand at the city of Washington, this seventh day of October, in the year of our Lord one thousand eight
80 hundred and fifty-six, and of the independence of the United States of America the eighty-first.

Countersigned and sealed with the seal of the Patent Office.

[L. S.]

GEORGE C. WHITING,
Acting Secretary of the Interior.

C. MASON,
Commissioner of Patents.

The Schedule referred to in these Letters Patent, and making
81 *part of the same.*

To all whom it may concern:

Be it known, that Henry A. Wells, late of the city, county, and State of New York, now deceased, did, in his lifetime, invent certain new and useful improvements in the process of and machinery for making hat bodies of fur, for which said improvements letters patent of the United States were granted to the said Wells,
82 bearing date the 25th day of April, 1846, of which the following is a full, clear, and exact description of the principle or character which distinguishes the said invention from all

other things before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this description, in which figure 1 is a plan of the machine; figure 2, a longitudinal, vertical section; and figure 3, a longitudinal elevation. The other figures will be described in their appropriate places. The same
83 letters indicate like parts in all the figures.

It has long been tried to make hat bodies by throwing the fibres of fur, wool, etc., by a brush or picker-cylinder, on to a perforated cone, exhausted by a fan below, to carry and hold the fibres thereon by the currents of air that rush from all directions towards and through the apertures of the cone, and thus form a bat of fibres ready for hardening and felting; but from various causes all these attempts have failed. Hat bodies are re-
84 quired to be made thick at and near the rim, and thin along the crown and tip, that the required strength may be given where it is required, without making the hat too heavy, and at too great a cost of material. This disposition of the fur can be obtained by the skill and judgment of the workman by the hand process, known under the name of "bowing," but cannot by the plan above referred to, for the reason that the fibres are only controlled by the currents induced through the apertures of the cone, or other form, by the exhaust, instead of being thrown and
85 properly directed for distribution, on to the cone, or other form. When the fibres are not properly thrown and directed, but are drawn to the surface by the action of the exhaust, the force thus induced gradually decreases as the apertures in the cone are closed up by the accumulation of the fur deposited on the outer surface thereof, and in consequence the impelling force, which carries the fibres, becomes insufficient to control the force of gravity which will then prevail, and cause the fibres to accumulate to a greater thickness on the tip of the cone, where much less
86 is required than below. And the said suggested plan cannot produce a practical result for the further reason, that there is no mode described by which the bat of fur fibres can be hardened while on the cone, that it may be removed from such cone preparatory to the after and well-known process of sizing or felting.

The invention of the said Henry A. Wells, by which the required practical result was obtained, consists in forming the bat of fur fibres, on a perforated cone, or other form, in the manner substantially as above described, in combination with the
87 hardening of such bat while on such cone, or other form, to give it the required consistency to admit of taking it off in a suitable condition for sizing by the well-known process of felting.

In the accompanying drawings (*a*) is a frame properly adapted

to the operative parts of the machine, and (*b*) the lower feed-apron, on which the stock is spread, by the attendant, in separate parcels, each sufficient for the formation of a hat, according to its intended weight. This apron, or endless belt of cloth, or other suitable material, passes around a roller (*c*) and a lip (*d*); the former at the back of the machine, with its bearings in sliding-boxes governed by set screws (*ee*) for the purpose of tightening the apron; and the latter near to the rotating brush (*f*), and so formed as to present a slightly rounded edge for the apron to pass over where it presents the fur to the action of the brush. Instead of this slightly rounded edge, a small metallic roller may be substituted; but when this is done, the roller should be supported at different points between its end journals, and this be effected by letting it run in a circular groove in the lip, as represented in section at figure 4, where (*g*) indicates this roller. The fur, as it is carried towards the lip (*d*), is gradually compressed by the upper apron (b^1), which passes around a feed-roller (c^1) and lip (d^1), in manner similar to the under feed-apron. The roller (c^1) runs in a frame (*i*)—of which the lip (d^1) forms part—hung on journals that rest in standards (*j*), so that the lip (d^1) can be made to press on to the fur between it and the under lip (*d*), and thus gripe the fibres and present them to the effective action of the brush (*f*). The under plane of the upper apron (b^1) is inclined to the upper plane of the lower one (*b*), the more effectually to present the fibres in the proper manner to the brush.

The roller (c^1) of the upper apron runs in sliding-boxes, governed by set screws (e^1e^1), and is placed forward of the journals of the frame, so that the tension of the belt (i^2), which communicates motion from the lower roller (*c*) to the upper one (c^1), may press the upper lip (d^1) on the under lip (*d*); but this may be effected by means of springs, weights, or other well-known mechanical devices for making pressure under similar circumstances.

The fibres, as they pass from the feed-aprons, are acted upon by a brush (*f*) that rotates with great velocity, and which is composed of parallel rows of stiff bristles projecting from a cylinder, but which may be differently constructed and composed, if desired. As the fibres are first presented, they are brushed and properly laid, by the downward action of the brush, as indicated by the arrow, and when liberated are carried down the curved surface (*l*) of a chamber or tunnel (*m*); and at the lower edge of this they meet a current of air—that enters a narrow aperture (*n*), near the bottom of the chamber, and extending the whole length of the brush—which being induced by the rotation of the brush and the partial vacuum in a perforated cone, prevents the fibres of fur from falling and resting on the bottom

of the chamber, and carries them on to the perforated cone (*o*). This chamber extends over and under the brush and the forward part of the lips, and turns on the journals of the brush, or is otherwise so arranged as to have a slight motion, the axis of which is the same as that of the brush. Its bottom rests on a set
93 screw (*p*), to regulate the delivery-end of the chamber relatively to the cone. Its forward end, in addition to this, is provided with a hinged flap (*q*), regulated by a cam lever, as a means of regulating the delivery of the fibres. Its top (*r*) is gradually elevated, and sides contracted, to make the delivery aperture nearly of the form of the cone, but narrower and higher. And its upper part is provided with a hood (*s*), so curved as to correspond generally with the curve of the tip of the cone. This hood is hinged to the upper part of the delivery aperture of
94 the chamber, and is connected with an eccentric (*t*) by means of a cord (*u*) and bell crank (u^1), that passes over a pulley (r^{11}), so that each revolution of this eccentric carries the hood up and down to direct the discharge and distribute the fibres on to the cone—a greater thickness being desirable in the parts of the bat which form the brim, than on the tip and crown; and when it is desired still further to diversify the distribution of the fibres, a cam can be substituted for the eccentric, and the connection
95 between it and the hood is formed as represented in section at figure 5, where the cam (*t*) acts on a lever (t^1), connected with the hood (*s*) by the cord (*u*).

The cone (*o*) is made in the usual manner, but of thin sheet-metal, perforated, instead of wire gauze. Its lower edge fits in a metallic ring (*w*), that runs in an appropriate collar in the upper part of a case (*x*), and its outer periphery is provided with cogs that mash into the cogs of a pinion (*y*)—concealed in the drawing by the pulley (d^2)—on a vertical shaft (*z*), by which a slow rotary motion is given to the cone, as the fibres are thrown on to
96 it, to distribute them equally all around the cone. The case (*x*) is sufficiently long to receive two rings (*w*), one on each side of the pinion (*y*), by which both are kept in motion, and the case—is made to swivel on a hollow collar (f^1), to which its bottom is fitted, so that when one cone is covered it may be turned aside by turning the case half a revolution, and another cone put on to the other ring, that another bat may be in the process of forming, whilst the one already formed may be prepared for the
97 hardening process in the manner to be hereafter described.

The case (*x*) communicates through the hollow collar (f^1), with an exhausting fan-blower (g^1), which consists of a vertical arbor (h^1), with oblique vanes (i^1), so that when rotating with great velocity in the direction of the arrow, the air is exhausted from the case (*x*) and the perforated cone (*o*). When one of the cones is removed from one of the rings (*w*), to be taken to the

hardening apparatus, the aperture in the ring (w) must be closed up with a cap-plate (w^2) to prevent the access of air. Any
98 other mode of exhausting the case and cone may be employed, but this is the most efficient which he (Wells) essayed.

The preparation of the formed bat for hardening is effected by covering it with pieces of felt or fulled cloth, just taken from hot water, and this is done in the following manner, namely: the attendant takes from a kettle of hot water a piece of felt cloth, rolled upon a roller, and applies one end of it to the surface of the bat, and as the cone rotates, the felt cloth winds from the roller on to the bat on the cone. Another piece of felt cloth is put on the top,
99 and then a strong perforated matallic cone (k^1)—see figure 6—is put over the whole, the more effectually to hold the fibres of the bat, and to make a slight pressure on them whilst it is immersed in hot water to harden. As the perforated cone (o) is better when made very thin, the pressure of the water when drawing it out of the kettle, after the bat has been hardened, tends to, and would collapse it, and therefore, to prevent this, another
100 perforated metallic cone (l^1)—see figure 7—is put inside, (before the whole is immersed in hot water,) to sustain the pressure in drawing the whole out of the hardening kettle. The relative situation of the three cones, the bat and the covering felt cloth, preparatory to the hardening process, is represented on an enlarged scale at figure 8, which is a vertical section through the whole. The inner sustaining cone may be dispensed with, if desired, by making the cone (o) of greater thickness and strength.

All the operative parts may be set in motion by any of the
101 known means, such as belts, as fully represented in the accompanying drawings, in which (m^1) is a main line shaft, overhead, driven by any first mover. From a wheel (n^1) on it, a band (o^1) extends to a pulley (p^1) on the shaft of the brush, which should make about two thousand revolutions per minute, more or less. From another wheel (q^1), on this same shaft, a band (r^1) extends to a pulley (s^1), on the shaft of which there is a wheel (t^{11}), that drives the exhaust fan (g^1) by the belt (u^{11}). And from a pulley (v^1) on the same line shaft, a belt extends to a wheel (w^1), on the shaft of which there is a pulley (x^1), from which ex-
102 tends another belt (y^1) to a wheel (z^1) on the shaft (a^2)—that carries the eccentric (t)—to give all the reduced motions required for the other parts of the machinery. From a wheel (b^2) on this shaft, a belt (c^2) extends to a pulley (d^2) on the shaft (z) that rotates the cone (o). And another pulley (e^2) drives the wheel (f^2) of the feed-roller (c) by the belt (g^2), and on the other end of the axle of this feed-roller there is a pulley (h^2) which drives by a cross-belt (i^2), the upper feed-roller (c^1). If desired, an alarm can be connected with the feed-roller of the lower apron to announce to

the attendant when each charge of stock is exhausted, that
103 the cones may be shifted. This can be done by connecting the arbor of the feed-roller (*c*) of the lower feed-apron, by a belt, with a wheel (k^2) provided with a cam or pin, to lift, at every revolution, the hammer (l^2) of a bell (m^2), the striking of which shall give requisite indication.

It will be obvious from the foregoing, that the hood may be operated by hand instead of machinery, thus substituting the attention, skill, and cost of an operative for the positive re-
104 gularity and cheapness of mechanical movements. It may be well to add, as a mere matter of precaution, that this invention is not limited to the making of hat bodies, but to the making of bats on formers of any other shape or configuration, the form of the delivery aperture of the chamber and the hood, and the movements of the latter, being properly adapted to the change of form of the perforated mould or former, with the restrictions indicated.

Having thus described the mode of application of the said invention of the said Henry A. Wells, as the same was success-
105 fully reduced to practice by him, we do not wish to be understood as limiting the claim of invention to such mode of application, as other modes may be devised, operating on the same principle, or having the same mode of operation, and only differing therefrom in the substitution of equivalent means.

What we claim as the invention of the said Henry A. Wells, deceased, in the process of making fur hat bodies, is the forming of the bat of fur fibres on a perforated cone, or other form, in manner substantially as described, in combination with the hard-
106 ening of such bat, while on such cone, or other form, to give it the required consistency to admit of taking it off in a, suitable condition for sizing by the well known process of felting, substantially as described.

CHARLES ST. JOHN,
H. A. BURR,
A. H. WRIGHT,
JAMES M. RIBLET.

WM. H. BISHOP,
ALEX. PORTER BROWNE,
107 *Witnesses.*

Schedule B.

Whereas I, Henry Augustus Wells, of the city, county, and State of New York, have invented a certain new and useful improvement in machinery for forming hat bodies, for which I have applied for letters patent of the United States; and whereas Charles St. John, of the said city of New York, has agreed to purchase from me all the

right, title, and interest which I have or may have in
108 and to the one equal undivided third part of the said invention and of the letters patent to be granted therefor, and has paid to me, the said Henry Augustus Wells, the sum of one dollar, the receipt whereof is hereby acknowledged, and has executed to me certain covenants, making to me a satisfactory consideration:

Now this indenture witnesseth, that for and in consideration of the sum of one dollar and the covenants aforesaid, I have assigned and transferred, and do hereby assign and tranfer, to the
109 said Charles St. John, the full one undivided third share and interest of and in the exclusive right to the said improvement made by me, as fully set forth and described by me in the specification which I have executed and filed in the Patent Office, preparatory to obtaining letters patent therefor; and also the full undivided third part of such letters patent, and of all benefit, profit, and emolument, right and interest, secured or to be secured thereby, to the sole use and behoof of the said Charles St.
110 John and his legal representatives.

And I do hereby covenant and agree to and with the said Charles St. John, his executors, administrators, and assigns, that I will at any time or times hereafter execute and deliver to him or them all such other and further assignments or assurances as may be necessary or proper in the complete, ample, and perfect fulfilment of a certain agreement in writing, under seal executed, by and between me and the said Charles St. John, bearing date
111 the fifteenth day of February, A. D. 1845.

In testimony whereof, I have hereunto set my hand and affixed my seal, this fifth day of March, in the year 1846.

H. A. WELLS. [L. S.]

In presence of—
J. T. JEWITT,
A. M. GUSTIN.

UNITED STATES PATENT OFFICE.

Received this the 8th day of April, 1846, and recorded
112 in Liber C, pages 24 and 25, of Transfers of Patent Rights.

In testimony whereof, I have caused the seal of the Patent Office to be hereunto affixed.

EDMUND BURKE,
Commissioner of Patents.

Seal of the Patent Office, [L. S.]

113 *Schedule C.*

Know all men by these presents, that I, Charles St. John, of the city of New York, for and in consideration of one dollar to me in hand paid by Alva B. Taylor, of the said city of New York, the receipt whereof is hereby acknowledged, have assigned, trans-

ferred, and set over, and by these presents do assign, transfer, and set over, unto the said Alva B. Taylor, the full one undivided ninth part, share, and interest of and in the exclusive right to a certain improvement in machinery for forming hat bodies,
114 for which letters patent were granted to Henry Augustus Wells, bearing date the twenty-fifth day of April, A. D. 1846, and whereof one undivided third share and interest was assigned to me by a certain instrument of assignment, executed by the said Henry Augustus Wells, bearing date the fifth day of March, in the year 1846, and recorded in the United States Patent Office on the 8th day of April, 1846, in Liber C 1, pages 24 and 25, of Transfers of Patent Rights, as by reference to the records of the said Patent Office will more fully appear.

115 In testimony whereof, I have hereunto set my hand and affixed my seal, this twentieth day of May, in the year 1846.

CHARLES ST. JOHN. [L. S.]

In presence of—
TIMO'Y T. MERWIN,
CHAS. M. KELLER.

UNITED STATES PATENT OFFICE.

Received this the 27th day of June, 1846, and recorded
116 in Liber D 1, pages 113 and 114, of Transfers of Patent Rights.

In testimony whereof, I have caused the seal of the Patent Office to be hereunto affixed.

EDMUND BURKE,
Commissioner of Patents.

Seal of the Patent Office, [L. S.]

117 *Schedule D.*

Know all men by these presents, that I, Charles St. John, of the city of New York, for and in consideration of one dollar to me in hand paid, by Henry A. Burr, of the said city of New York, the receipt whereof is hereby acknowledged, have assigned, transferred, and set over, and by these presents do assign, transfer, and set over, unto the said Henry A. Burr, the full one undivided
118 ninth part, share, and interest, of and in the exclusive right to a certain improvement in machinery for forming hat bodies, for which letters patent were granted to Henry Augustus Wells, bearing date the twenty-fifth day of April, A. D. 1846, and whereof one undivided third share and interest was assigned to me by a certain instrument of assignment, executed by the said Henry Augustus Wells, bearing date the fifth day of March, in the year 1846, and recorded in the United States Patent Office on the 8th day of April, 1846, in Liber C 1, pages 24 and 25, of
119 Transfers of Patent Rights, as by reference to the records of the said Patent Office will more fully appear.

In testimony whereof, I have hereunto set my hand and affixed my seal, this twentieth day of May, 1846.

CHARLES ST. JOHN. [L. S.]

In presence of—
TIMO'Y T. MERWIN,
CHAS. M. KELLER.

UNITED STATES PATENT OFFICE.

Received this the 27th day of June, 1846, and recorded
120 in Liber D 1, pages 112 and 113, of Transfers of Patent Rights.

In testimony whereof, I have caused the seal of the Patent Office to be hereunto affixed.

EDMUND BURKE,
Commissioner of Patents.

Seal of the Patent Office, [L. S.]

121 *Schedule E.*

Know all men by these presents, that I, Henry Augustus Wells, of the city of New York, for and in consideration of eight thousand dollars to me in hand paid by Merwin R. Brewer, of said city, the receipt whereof is hereby acknowledged, have assigned, transferred, and set over, and by these presents do assign, transfer, and set over, unto the said Merwin R. Brewer, the full two undivided third parts, share, and interest, of and in the exclusive right to a certain improvement in machinery for forming fur hat
122 bodies, for which letters patent were granted to me, the said Henry Augustus Wells, bearing date the twenty-fifth day of April, in the year of our Lord one thousand eight hundred and forty-six.

In testimony whereof, I, the said Henry Augustus Wells, have hereunto set my hand and affixed my seal, this twenty-second day of March, in the year of our Lord one thousand eight hundred and forty-eight.

H. A. WELLS. [L. S.]

In presence of—
EDWARD CLARK,
123 ALFRED H. CORNING.

UNITED STATES PATENT OFFICE.

Received this the day of , 1848, and recorded in Liber , pages , of Transfers of Patent Rights.

In testimony whereof, I have caused the seal of the Patent Office to be hereunto affixed.

EDMUND BURKE,
Commissioner of Patents.

124 Seal of the Patent Office, [L. S.]

Know all men by these presents, that I, Merwin R. Brewer, of the city of New York, for and in consideration of three thousand two hundred and fifty dollars, to me in hand paid by Charles St. John, Henry A. Burr, and Alva B. Taylor, of said city, and other good considerations, the receipt whereof is hereby acknowledged, have assigned, transferred, and set over, and by these present do assign, transfer, and set over, unto the said Charles St.
125 John, Henry A. Burr, and Alva B. Taylor, the full two undivided third parts, share, and interest of and in the exclusive right to a certain improvement in machinery for forming fur hat-bodies, for which letters patent were granted to Henry Augustus Wells and his assigns, bearing date the twenty-fifth day of April, in the year of our Lord one thousand eight hundred and forty-six.

And I hereby covenant with the said Charles St. John, Henry A. Burr, and Alva B. Taylor, that I have not done or suffered any act, since the said two undivided third parts of said
126 patent right were assigned and transferred to me, on the twenty-second day of March, A. D. 1848, whereby the title to the same has been or may be encumbered, defeated, or impaired.

The foregoing assignment of said two undivided third parts of said patent is made subject to the lien of a certain agreement, in writing, bearing date the fifteenth day of December, A. D. 1848, between the said Charles St. John, Henry A. Burr, and Alva B. Taylor, parties of the first part, and Henry A. Wells, party
127 of the second part, whereby the parties of the first part agree to pay to the party of the second part, or his representatives, the sum of one hundred dollars a month, on certain conditions therein mentioned, during the continuance of said patent right, and the renewal thereof, should the same be renewed.

In testimony whereof, I, the said Merwin R. Brewer, have hereunto set my hand and seal this fifteenth day of December, in the year of our Lord one thousand eight hundred and forty-eight.

128 M. R. BREWER.

In presence of—
EDWARD CLARK,
ALFRED H. CORNING.

UNITED STATES PATENT OFFICE.

Received this 8th day of January, 1849, and recorded in Liber U 1, page 15, of Transfers of Patent Rights.

In testimony whereof I have caused the seal of the Patent Office to be hereunto affixed.

EDMUND BURKE,
Commissioner of Patents.

129 Examined.—W. H. S.

Schedule.

This agreement, made the second day of May, in the year 1854, by and between Alva B. Taylor, party of the first part, and Albert H. Wright and James M. Riblet, parties of the second part, witnesseth:

First. The said party of the first part, in consideration of
130 the covenants herein contained, to be kept and performed by the parties of the second part, does hereby sell, assign, transfer, and set over unto the said parties of the second part, their representatives and assigns, all the right and interest, of every name, nature, and description, of him the said party of the first part in the co-partnership business, of the firm of H. A. Burr & Co., of the city of New York, as the same stood on the first day of January, in the year 1854; and also the right and interest of the said party of the first part in the machinery, stock in trade,
131 book accounts, contracts, evidences of debt, and all other property, including patent rights (the interest in which is also to be assigned by distinct instruments in due form to be recorded) belonging to, or held, owned, or enjoyed by the said firm of H. A. Burr & Co., as the same were on the said first day of January, 1854; provided, however, that the aforesaid sale and transfer shall not in any way affect the dividend declared in favor of the said party of the first part, out of the profits of the business of said firm of H. A. Burr & Co., previous to the first day of January, 1854, and paid over to him on or about the first day
132 of February, 1854, which dividend it is expressly understood belongs to, and is to be retained by, the said party of the first part.

Second. The parties of the second part, in consideration of the premises, agree to obtain and deliver to the party of the first part a good and sufficient deed of conveyance, executed in due form of law by Henry A. Burr and wife, of all the right, title, and interest of said Burr and wife of, in, or to a certain parcel of real estate, consisting of lands and improvements thereon, situated in
133 the city of Newark, Essex county, New Jersey, subject to the existing incumbrances thereon, being the same property conveyed to the said party of the first part, and the said Henry A. Burr, by Jesse C. Hedenberg, by deed bearing date the first day of October, in the year 1849, and the interest of said Henry A. Burr and wife, being an undivided half, subject to incumbrances. Said deed to be delivered at the execution of this contract.

Third. The parties of the second part, in consideration of
134 the premises, further agree to pay to the said party of the first part the sum of forty thousand dollars, in manner following—that is to say, five thousand dollars at the time of executing and delivering this agreement, fifteen thousand dollars on the twentieth day of May, 1854, and the balance of twenty thousand

dollars in four promissory notes, to be made by the said Henry A. Burr, and drawn payable to the order of, and endorsed by, the parties of the second part, all to bear even date herewith, to be for the sum of five thousand dollars each, and to be payable one in three months, one in six months, one in nine months, and one in twelve months after the date thereof.

Fourth. It is hereby mutually understood and agreed between the said parties, that the parties of the second part shall assume all the liabilities of the parties of the said party of the first part, in any and all suits pending in regard to the business of the said firm of H. A. Burr & Co., or the patents or property of the said firm, and shall save the party of the first part harmless from all costs or damages therein, but that the name of the party of the first part may be used in any suit at law or in equity relating to the business of said firm, should it be necessary so to do; but in such cases the parties of the second part shall indemnify and save harmless the party of the first part against all costs, damages, and expenses in any such litigations.

In witness whereof, the said parties have hereunto set their hands and seals the day and year first above written.

(Signed) A. B. TAYLOR, [L. S.]
A. H. WRIGHT, [L. S.]
JAS. M. RIBLET. [L. S.]

In presence of—
JOS. W. HARPER, 2d.

Schedule.

Whereas Alva B. Taylor and Henry A. Burr, of the city, county, and State of New York, did obtain letters-patent of the United States, for a certain improvement in machinery for making hat bodies, which letters-patent are dated the 9th day of February, 1847:

And whereas the said Alva B. Taylor is desirous of disposing of his interest in said patent:

And whereas Albert H. Wright and James M. Riblet are desirous of purchasing the same.

Now, this indenture witnesseth, that for and in consideration of the sum of one dollar, to me in hand paid, and certain other valuable considerations, the receipt whereof is hereby acknowledged, I, the said Alva B. Taylor, have assigned, sold, transferred, and set over, and do by these presents assign, sell, transfer, and set over unto the said Albert H. Wright and James M. Riblet all my right, title, and interest in and to said letters-patent, the same being one undivided half part thereof, subject, however, to the right of Charles St. John to enjoy the benefit of the use of the said patent, as one of the firm of H. A. Burr & Co., as ascertained and fixed by an agreement between said St. John, Burr & Taylor,

bearing date November 13th, 1852, the same to be held and enjoyed by the said Albert H. Wright and James M. Riblet
140 for their own use and behoof, and for the use and behoof of their legal representatives, as full and entirely as the same might have been held and enjoyed by me had not this assignment and sale been made.

Witness my hand and seal, this second day of May, A. D. 1854.

A. B. TAYLOR. [L. S.]

In presence of—
JOHN HARPER,
JOS. W. HARPER, 2d.

141 UNITED STATES PATENT OFFICE.

Received the 22d day of May, 1854, and recorded in Liber F 3, page 471, of Transfers of Patent Rights.

In testimony whereof, I have caused the seal of the Patent Office to be hereunto affixed.

[L. S.]

A. MASON,
Commissioner of Patents.

142 *Schedule.*

Whereas Henry A. Wells, of the city, county, and State of New York, did, in his lifetime, obtain letters-patent of the United States for a certain new and useful improvement in machinery for forming hat bodies, which letters-patent are dated the 25th day of April, 1846:

And whereas Charles St. John, Henry A. Burr, and Alva B. Taylor, all of the city, county, and State of New York, are now the owners of said letters-patent—that is to say, each one un-
143 divided third part thereof, as will the more fully appear from the record of assignments at the Patent Office at Washington:

And whereas the said Alva B. Taylor is desirous of disposing of his interest in said patent:

And whereas Albert H. Wright and James M. Riblet, of New York, aforesaid, are desirous of purchasing the same:

Now, this indenture witnesseth that I, the said Alva B. Taylor, for and in consideration of the sum of one dollar, to me in hand paid, and certain other valuable considerations, the receipt
144 whereof is hereby acknowledged, have assigned, sold, transferred, and set over, and do, by these presents, assign, sell, transfer, and set over unto the said Albert H. Wright and James M. Riblet, all my right, title, and interest in and to said letters patent, the same being one undivided third part thereof; the same to be held and enjoyed by the said Albert H. Wright and James M. Riblet, for their own use and behoof, and for the use and behoof

of their legal representatives, as fully and entirely as the same might have been held and enjoyed by me, had not this as-
145 signment and sale have been made.

Witness my hand and seal, this second day of May, 1854.

A. B. TAYLOR. [L. S.]

In presence of—
H. E. BODWELL,
H. A. BURR.

UNITED STATES PATENT OFFICE.

Received the 22d day of May, 1854, and recorded in Liber F 3, page 470, of Transfers of Patent Rights.

In testimony whereof I have caused the seal of the Patent
146 Office to be hereunto affixed.

[L. S.]

A. MASON,
Commissioner of Patents.

Whereas two separate letters patent have been granted to Charles St. John, Henry A. Burr, Albert H. Wright, and James
147 M. Riblet, upon a surrender of certain letters patent, originally granted to Henry A. Wells, for an improvement in machinery for making hat bodies, which said two reissued letters patent bear date the 30th of September, A. D. 1856, and the 7th of October, 1856, respectively, and are entitled for "a new and useful improvement in machinery for making hat bodies," and for "a new and useful improvement in manufacturing hat bodies," of which said letters patent I was an owner to the extent of one undivided third part; and whereas Henry A. Burr is desirous to purchase that undivided third part:

148 Therefore, in consideration of the sum of twenty thousand dollars to me paid by said Henry A. Burr, at this date, I have assigned, and hereby do assign to said Henry A. Burr, all my right, title and interest of, in and to the said letters patent, and all the profits which may be due me up to this date, either for tariffs or infringements of said letters patent, and all my right, title, and interest in the machinery constructed under said patents, for the manufacture of hats, owned by H. A. Burr & Co., in the city of New York, or elsewhere.

149 Dated at New York, this eighth day of November, A. D. 1856.

CHARLES ST. JOHN.

SOUTHERN DISTRICT OF NEW YORK.

On the twelfth day of November, in the year one thousand eight hundred and fifty-six, before me, personally came Charles St. John, known to me to be the individual described in, and who executed the within conveyance, and he acknowledged to me that he
150 executed the same for the purpose therein mentioned.

R. E. STILWELL,
United States Court in the Southern District of New York.

UNITED STATES OF AMERICA,
Southern District of New York, ss.

I, John W. Nelson, clerk of the circuit court of the United States of America, for the southern district of New York, second circuit, do hereby certify that I am well acquainted with the
151 handwriting of R. E. Stilwell, whose name is subscribed to the annexed certificate, and that the signature to the same is in his proper handwriting. And I do further certify that he was, at the time of signing the same, a United States Commissioner, duly appointed by the circuit court of the United States of America, for the southern district of New York, second circuit.

In testimony whereof I have hereunto subscribed my name, and affixed the seal of the said circuit court, this twelfth day of November, in the year of our Lord one thousand eight
[L. S.] hundred and fifty-six, and of the independence of the
152 United States the eighty-first.

J. W. NELSON, *Clerk.*

A true copy of the original, except the drawings.
Attest: ALFRED BLACKMAN, *Clerk.*

In the Circuit Court of the United States for the district of
153 Connecticut—in Equity.

HENRY A. BURR, ALBERT H. WRIGHT, and JAMES M. RIBLET,
vs.
GEORGE E. COWPERTHWAITE, impleaded with ALVA B. TAYLOR.

154 The answer of George E. Cowperthwaite, defendant, to a bill of complaint of Henry A. Burr, Albert H. Wright, and James M. Riblet. This defendant now, and at all times hereafter, saving and reserving to himself all and all manner of benefit and advantage of exception that can or may be had or taken to the many errors, insufficiencies, and imperfections in the said bill of complaint contained, for answer thereto, or to so much thereof as he is advised it is material and necessary for him to make
155 answer unto, answering, says, that so far as he has any knowledge or information, he does not believe, and therefore denies that Henry Augustus Wells mentioned in the complainants' bill of complaint, either before the 25th day of April, 1846, or at any other time, invented a new and useful improvement in the machinery for making hat bodies, or in the manufacture of hat bodies, or that he ever was the original and first inventor of any such improvements, and this defendant is not sufficiently
156 informed to form a belief whether or not said Wells entered a caveat in the Patent Office, as stated in said bill, and leaves the said complainants to make such proof thereof as they shall be advised.

And this defendant further says, that he is informed and believes, and therefore admits, that said Wells did make application for a patent to the Commissioner of Patents, and that he did execute and file a specification in the Patent Office, and that he did execute an assignment to Charles St. John of some interest in his supposed invention, and that letters patent were issued to said Wells,
157 granting to him the exclusive right of making, using, and vending certain supposed improvements described and claimed in said specification. But what interest he so assigned to said Charles St. John, or on what conditions, or at what time such assignment was made, this defendant does not know, and is not informed, except by the complainants' bill of complaint, and leaves the complainants to make such proof thereof as they shall be advised.

And the defendant further says, that whether or not said Charles St. John assigned to the complainat, Henry A. Burr, or to
158 one Alva B. Taylor, or whether Henry A. Wells assigned to Mervin R. Brewer, to Charles St. John, Henry A. Burr, and Alva B. Taylor, as set forth in said bill of complaint, or what interests were so assigned, or whether such assignments were so recorded, or were legal and valid, or whether or not the entire interest in said letters patent became vested in said St. John, Burr, and Taylor in common, this defendant does not know, and is not informed, save by the complainants' bill of complaint, and leaves the complainants to make such proof thereof as they shall
159 be advised.

And this defendant says, that he is informed and believes, and therefore admits, that said St. John, Burr, and Taylor did put into extensive use some of the alleged improvements described in said patent, but not all of them, for he is informed and believes, and avers, that several of said alleged improvements were not capable of being used to advantage, and were useless; and
160 that those of said alleged improvements which were so put into use, were put into use and made available and practicably useful only, or chiefly, by the skill, ingenuity, and invention of improvements thereon by said Taylor.

And this defendant further answering says, that he is informed and believes, and therefore admits, that a bill was filed against Mead, Stitcher and others, and the court ordered issues to be tried by a jury, and that they came on to be tried as stated in the complainants' bill, and that the finding of the jury sustained the validity of the patent in whole or in part, and in convicting the defendants therein of infringement; but this defendent is in-
161 formed and believes, that said patent was so sustained only for the peculiar trunk or guide, with its fixtures, in combination and for the use of hot water to harden the bats while on the cone, and that the infringement found consisted in the use of

one or all of those things; and that said patent in said suit was not sustained, as covering what is claimed by the complainants in this suit, and by virtue of the reissued patents on which this suit is brought. And this defendant, on information and belief,
162 denies that the plaintiffs in said case proved that a machine such as Williams described, could not manufacture a practically useful hat body, or that he never had any idea of making a fur hat body by the process of felting, or that his only attempt was to make forms by mixing cohesive compounds with some fibrous material, which had been delivered for that purpose from a carding machine.

And this defendant further answering, denies that the plaintiffs in said suit proved that the said Wells, as early as the winter or spring of 1833 or 1834, before he had been in England, or seen Williams or his machine, had designed the invention which
163 he afterwards prtented, and had described it to two or any persons, as is alleged in said bill of complaint; and he, on information and belief, denies that said Wells had invented, as early as the time when he was so in England, or that he communicated to any person, any plan or machinery for making hat bodies, which he subsequently patented, or intended to patent, by the patent aforesaid.

164 And this defendant further answering, on information and belief says, that neither Alva B. Taylor, nor any other person or persons, ever established the validity of said original letters patent for anything more than as above stated, and that no decision of any court or judge has ever been had or rendered on said patent to any different effect; and he denies that said Taylor, or any other person or persons, ever proved that said Wells was not indebted to said Williams for any information, as stated in said bill, or that the invention of said Williams could not
165 be used to produce a hat body. And this defendant further answering says, that he has been informed and believes, and he admits, that injunctions were issued restraining persons from infringing said patent, but this defendant was not a party to, or interested in, any suit in which any such injunction was granted, nor does he know to what extent, or with what efficiency, the same was defended; but this defendant is informed and believes, and insists, that no injunction has ever been granted on said patent against a machine, process, or means of making hat bodies like, or substantially that employed by the defendant, and that
166 no trial has ever been had on either of the reissued patents, on which this suit is brought, and that no injunction has ever been granted on either of said reissues, where there has been a denial of the validity, or a hearing on the merits.

And this defendant further answering, says that he does not know, and is not informed, save by the complainants' bill of com-

plaint, and cannot answer on information and belief or otherwise, whether or not said Taylor offered to sell his interest to Albert H. Wright, or whether or not said Wright, having known the
167 facts, agreed to purchase, conjointly with James M. Riblet, as stated in said bill, and leaves the complainants to make such proof thereof as they shall be advised; but this defendant is informed and believes, and therefore admits, that said Wright and Riblet did purchase the interest of said Taylor, but whether by or according to the agreement referred to by said bill, this defendant does not know, and is not informed, save by said bill, and leaves the complainants to produce the same, and make such proof thereof as they shall be advised.

And this defendant further answering, says that he does
168 not know, and is not informed, save by the complainants' bill of complaint, and therefore cannot answer, whether or not said St. John assigned to said Burr his undivided third of said patent, or whether such assignment was recorded as stated in said bill, and leaves the complainants to make such proof thereof as they shall be advised.

And this defendant further answering, on information and belief, denies that in the original patent granted to said Wells there were errors by reason of which the patent was inoperative, to secure the full benefit and advantages of all that said Wells
169 invented or intended to patent, and of all he described in his said patent as his invention, or that there were any such errors which arose from inadvertence, accident, or mistake; or that such patent was surrendered and a reissue sought from any such cause.

And this defendant further answering, admits that two reissued letters patent were granted and issued to said complainants, bearing the titles and under the dates as stated in said bill; but he denies that they, or either of them, under the construction which said complainants claim for them, were for the same invention or in-
170 ventions as was said original patent, or as was described therein: on the contrary, he believes and avers, that said reissued patents, and each of them, under the construction which said complainants claim for them, are and is for different and other inventions, and cover inventions and things not made by said Wells, or known to said Wells; and that the object and purpose of the aforesaid surrender and reissues was to include in and cover, by the reissues, more than said Wells was the inventor of, and more than he had described or claimed as his invention, and
171 things which had been invented by others, and to render the reissues equivocal, and that the same was fraudulent, and that said reissues are equivocal and null and void, and the defendant insists that each of said reissued patents are too broad,

and claim and cover more than said Wells was the first inventor of, and subject-matters and things which are not patentable, and that they are not for the same invention as was the original pat-
172 ent, and are not, nor is either of them, limited to the inven-tion described in said original patent, and he does not know that the copies annexed to said bill are correct copies of said reissued patents, and prays the production of the patents.

And this defendant says that the statements in said bill of complaint, that this defendant and Alva B. Taylor are using machinery at Danbury for the fabrication of hat bodies, is untrue ; and says that so far as he knows, is informed, or believes,
173 said Taylor has never, alone or in connection with any other person or persons, made, or been interested in the making of hat bodies at Danbury.

And this defendant further answering, denies that, either alone or in connection with said Taylor, or any other person, he is using or has been using machinery at Danbury, or within the jurisdiction of this court, for the fabrication of fur hat bodies, substantially the same as that specified and described in the letters patent dated Sept. 30th, 1856, or any improvement in the manufacture of hat bodies substantially the same as that specified and described in the reissued letters patent, dated Oct. 7th, 1856, and he denies
174 that he is, or was at the time of the commencement of this suit, using machinery for the manufacture of hat bodies, in which the fur to compose the hat bodies is fed by an apron, to a revolving brush or picker, by which it is picked or separated and thrown upon a perforated hollow cone, by means whereof the fur is distributed upon and confined to the surface of said cone in suitable quantities to form hat bodies, as specified in said patent reissued Sept. 30th, 1856, and he denies that he uses, or at the time of the commencement of this suit was using, or since the afore-
175 said surrender and reissues has used, any process in the manufacture of hat bodies, or in removing them from the cone on which they have been formed, substantially as claimed in the said reissued patent of October 7th, 1856.

And this defendant further answering, admits, that in 1851 he took a license under said original patent, and sold the same, as stated in said bill; but he says he was enabled to so sell, in consequence of his having bestowed great labor and expense in
176 starting and establishing the business of making hat bodies, the advantages of which accrued to the purchaser, and that this defendant never made anything like the sum of twelve thousand dollars on said license, and he denies that he acknowledged the validity of said patent by taking any license under the same, or by paying tariffs and accounting for the use of machines.

And this defendants admits, that in 1853 he took another license,

as stated in said bill, and he says that in all respects he has kept and performed all agreements which he has made with any of
177 said complainants; and is advised and insists that he is in no way estopped or prejudiced in his right of defence in this suit from, or by virtue of, his having accepted or taken such licenses.

And this defendant says that he is, and for more than a year last past has been, engaged in the manufacture of hat bodies in Danbury, in the State of Connecticut, by the use of machinery, but that he is so engaged alone, and without any partner or any other person being connected or interested with him therein; and that one of the machines employed by him in said business is
178 made according to, and under the letters-patent granted and issued by the United States to William Fosket, bearing date the 23d day of January, 1840, and of which patent this defendant is, and for several months has been, and prior to the commencement of this suit was, one of the owners; and this defendant denies that he has ever pretended that any machine used by him is the same as that described by Williams in the 10th volume of Newton's London Journal, and he denies that such a method as Williams described could not make a hat body; and he denies
179 that he has pretended that he derived his knowledge how to make hat bodies from the description of said Williams, and denies that in the method described by said Williams there is no mode described by which the fibrous materials are guided nor distributed upon the cone, or that no guide could be used therein, if one had been contemplated, or that the greater part of the material would necessarily fall upon the tips of the cones where it is not needed, and but little on the base, where it is necessary; and he denies that the improvement invented by said Wells con-
180 sists in throwing, guiding, and directing the fur, and depositing it on the cone in such thickness and quantity as the operator may desire, as stated in said bill, but, on the contrary, he says that the supposed improvement of said Wells, and all he patented or described as his invention in and by his said original patent, respecting forming a hat body on a cone, was the trunk and its fixtures, in combination, as stated, with his said original patent. And this defendant says that he did not obtain his
181 knowledge how to make hat bodies, as he has made them in Danbury, from the invention of said Wells.

And this defendant says, that he has not, and does not use or employ any machine or process in the manufacture of hat bodies at Danbury, or at any other place, since the aforesaid surrender and reissues, in principle, construction, or mode of operation, like, or substantially, anything invented by said Wells, or included in, or covered by, his said original patent, or described in either of the said reissues thereof, or which is covered by, or included

182 in, or patented by either of said reissues, when so construed as not to render them null and void. And that the machines and processes used by this defendant are entirely independent of, and distinct and different from, anything described or claimed in said original patent as the invention of said Wells, or described as his invention in either of said reissues, or which is covered by, or included in, or patented by either of said reissues, under any construction thereof, which would not render them invalid and void; and this defendant insists that no construc-
183 tion can be put upon or given to said reissued patents, or either of them, making them, or either of them, sufficiently broad and comprehensive to cover or include anything which this defendant uses or employs in the manufacture of hat bodies, without at the same time rendering such patent or patents so broad as to cover inventions and things known and used before the said supposed invention of said Wells; or to cover unpatentable subject-matter, and thereby rendering such patent or patents invalid and inoperative.

And this defendant denies any and all infringement and
184 violation, and all intention to infringe any of said patent rights, stated and charged in said bill of complaint, or any right or privilege belonging to said complainants, and he denies any and all communication and confederacy stated and charged in said bill.

And this defendant further answering, says that he is advised, and believes and insists that there has never been any verdict of a jury, or any decision of any court or judge, on a hearing on the merits, to the effect of sustaining said reissued letters-patent,
185 or either of them, or of sustaining any patent for what said complainants claim, under and by virtue of said reissued patents, and that, on the contrary, the purport and effect of the proceedings and results of the litigations which have been had thereon, and procured and published, from time to time, by owners of said patents, or an interest therein, and among them by the complainant Burr, are such as to show and prove that this defendant understood and believed that the said supposed invention of said Wells, and all letters-patent which had been or could
186 be issued therefor, were limited to what the said original letters-patent purports to be for: that is, to the peculiar trunk and conductor therein described, in combination with other parts, and the preparation of the bat by immersion into hot water, and the peculiar double feed-apron, in combination with other parts, all as set forth in said original patent; and that he has never acknowledged or supposed anything else to be within said patent, or that anything else could be legally or justly put into any reissue thereof; and he says that he has never supposed, ac-
187 knowledged, or believed that the reissued patents granted to the assignee upon the surrender of said original patent,

and on which this suit is brought, are valid or operative, and believes that said reissues were obtained for the purpose of appearing to cover what said assignees have no right to, and to embarrass manufacturers, and to deter the public from using what they have a right to.

And this defendant says that he is established in the business of making hat bodies on his plan, and upon the plan of the
188 Fosket patent, and that he left other business, and has purchased machinery, fixtures, and other property, and has procured buildings for that purpose, and has invested several thousand dollars therein, and with full belief that it would be a just and lawful business, and without any intention of infringing or encroaching upon the rights of any one, all of which outlay and property would be substantially lost, unless the defendant continues his said business.

And this defendant says, that in coming to the conclusion to engage in the manufacture of hat bodies on his said plan, he
189 was encouraged to do so, and led to understand that it would right and lawful and perfectly free from any infringement upon the Wells patent, by frequent conversation with the complainant, Burr, and other owners of the Wells patent, in which conversations said Burr, before this defendant commenced or prepared for said manufacture, frequently told this defendant, that the Wells invention consisted only of the trunk with its hood or peculiar delivery, and the dipping of the bat into hot water, and that he (Burr) depended upon that trunk to sustain the
190 patent. And this defendant says that he had conversations of like import with said Burr and other owners of the Wells patent, at different times, for several years, and frequently while suits were pending on the Wells patent against alleged infringers; and this defendant says he was brought to a similar conclusion from observing the tenor of the affidavits and other evidence which has been produced, from time to time, in behalf of said patent, and by the owners thereof prior to the year 1856, and before this defendant prepared for his said manufacture; and he says that he was
191 informed and understood the trial in Philadelphia, referred to in the complainants' bill, to have proceeded and terminated on the same basis, and with a like understanding of the court and jury and all concerned therein; and all that the defendant uses in making hat bodies, either of machinery or process, was, and until very recently has been acknowledged by the owners of the Wells patent to be within or covered by the patent or the Wells invention, but free for any one to use, who should be willing
192 to compete with their more rapid system of making hat bodies by the Wells trunk and immersion into water.

And this defendant further answering, says, that on and before the time of the application of the said Henry A. Wells for letters

patent of United States, as in the said bill of complaint is alleged, various machines and processes for the manufacture of hat bodies had been invented, and were known, used, patented, published, described, filed, and exhibited of record, constituting a certain state of the art, which was then or has since become and
193 continued to be public property, free and common to be used by this defendant and all other persons; that numerous machines and processes, so described, patented, known, and used anterior to the date of said patent, embraced substantial portions of the machinery and processes mentioned in the specification of said letters patent of said Henry A. Wells, and also of what is patented by said reissued patents, if construed as the complainants insist upon having them construed.

And this defendant further answering, says, that in
194 order to inform the honorable court as to the state of the art at and prior to the date of said letters patent of said Henry A. Wells, and with a view to the proper understanding thereof, he refers, among other things, to the letters patent of the United States granted to Stephen Hurlbut, June 13th, 1831, in which letters patent is described a process of hardening hat bodies on a perforated conical former, by the use of steam, an outside cover, and a vibratory motion; and on information and belief, he says that the same was known to and used by said Hurlbut
195 and others, at near Hartford, Connecticut, prior to the time of the said supposed invention of said Wells.

Also to the letters patent of the United States granted to Thomas Blanchard, of June 14th, 1837, in which letters patent is described a process of forming fur hat bodies, by the employment of a perforated metallic cylinder, and other forms, revolving exhaust, and fan blower, in combination with other parts, as therein described; and, as this defendant is informed and believes, the same was known to and used by said Blanchard, now of Boston, Massachusetts,
196 and others in his employment, at Brooklyn, New York, and at Millville, New Jersey, and was known to and used by him and divers other persons long before the time of the said supposed invention of said Wells.

Also to the letters patent of the United States granted to the aforesaid Henry A. Wells, in conjunction with James James and Robert W. Peck, September 22d, 1837, in which letters patent the aforesaid Wells described as known and in use a metallic vacuum cylinder, the employment of a fan or picker for distributing and discharging the fibres of fur, a mode of varying the thickness
197 of deposit on the bat; and the said Henry A. Wells described said parts and processes, and admitted the same to be known and used before, and disclaimed the invention of the said parts and processes; and on information and belief, he says that the same was known to and used by the said Wells and the

said Peck, of Brooklyn, and said James, of Brooklyn, New York, at Brooklyn, and by A. Peck and J. D. Condit, at Millville, New Jersey, now of said Millville, in the State of New Jersey, and in the city of New York, and other places, and was known
198 to and used by them and divers other persons long prior to the time of the said supposed invention of said Wells.

Also to the letters patent of the United States granted to Henry A. Wells, and James James, and R. W. Peck, September 20th, 1837, for a machine for forming fur webbing into hat bodies, and hardening the same, in which fur bats were formed upon a conical former, and steam applied thereto while on the cone for hardening; and on information and belief he says, that the same was known to and used by the said Wells, and said Peck, of Brooklyn,
199 and said James, of Brooklyn, at Brooklyn, in the State of New York, and by A. Peck and J. D. Condit, of Millville, at Millville, in the State of New Jersey, and in the city of New York, and other places, and was known to and used by them and divers other persons long prior to the time of the said supposed invention of said Wells.

And also to letters patent of the United States to Hezekiah S. Miller, dated March 5th, 1839, for machines for making fur hat bodies, in which are exhibited and described a fan for dis-
200 tributing and throwing the fur, a trunk for convulsing a current of air, and a perforated cylinder for receiving the fur, and a method of varying or regulating the thickness of the fur; and on information and belief he says, that the same was known to and used by said Miller, then of Philadelphia, and divers other persons, at said Philadelphia, for long prior to the time of the said supposed invention of said Wells.

Also to the English letters patent of T. R. Williams, sealed February 14th, 1833, and to the publication thereof in New-
201 ton's Journal of Science and the Arts, volume 10, 3d series, page 73.

Also to the English letters patent of J. R. Williams, sealed the 20th day of September, 1839, and to the publication thereof in Newton's London Journal, vol. 18, page 239.

Also to the English letters patent of T. R. Williams, sealed 7th of April, 1845, and to the publication of the same in the London Journal, vol. 29, page 225.

Also to the letters patent of the United States to T. R. Williams, of April 24th, 1840, and the records and files of his appli-
202 cation therefor in the United States Patent Office; and on information and belief he says, that the said several inventions and improvements exhibited and described in the aforesaid several patents of said Williams, as well as other improvements in the machinery and process for making hat bodies, and substantial and material parts of which are contained in the aforesaid letters

patent of said Wells, were known to and used by divers other persons at divers places long prior to the time of the aforesaid supposed invention by said Wells; and that said Wells was
203 acquainted with said Williams, and was at his place where he was employing said improvements, and received a knowledge thereof, and was instructed by said Williams in the art and means of making hat bodies, including things which said complainants seek to acquire a monopoly of by said reissued letters patent, long before the time of the said supposed invention of the said Wells; and at which time said Williams and the men in his employment instructed said Wells how to make hat bodies by the use of a revolving perforated exhausted cone, in combina-
204 tion with a picker with an endless feeding apron; and how to harden the bat while remaining on the cone on which it was formed, by covering the same with an outer cone case, and then removing the whole from the exhaust and immersing it into a hot or warm liquid; and that this defendant is informed that all the substantial and material parts and things claimed by said Wells as his invention, he received a knowledge of from said Williams, and from his and others' uses of said Williams's invention prior to said Wells making any invention thereof; and
205 which things, so communicated to said Wells, the complainants now claim the right to monopolize to themselves by virtue of said reissued letters patent. And he is informed that the complainant Burr has stated that he did not believe that said Wells was the inventor of any important part of the improvements patented by him.

Also to the letters patent of the United States granted to William Foskett, dated January 23d, 1846, and to his caveat previously filed in the Patent Office, and to the records and
206 files of his application for said caveat and patent, now in the Patent Office.

And to the other well known and familiar publication and books of science, and the art in which various machines and processes for making fur, and forming fur and wool hats, and for hardening fur and wool, and for felting fur and wool hat bodies, are set forth.

And the defendant says, that long prior to the said supposed invention of said Wells, the invention of a combination of an endless apron to feed the fur to a picker, a picker to disintegrate
207 the fur and throw it into a trunk or conductor towards a revolving, perforated, exhausted cone; a trunk and conductor to receive the fur, and guide and conduct the fur towards the cone, as wafted along by the current of air; a cone standing upon its base and over, and its interior communicating with a box exhausted of air by a blower, to cause the fur to be deposited and held upon the cone; devices of several different kinds for controlling the deposit of fur, so as to make the bat thicker or thinner

208 in such parts as required; devices and means for hardening the bat while on the cone on which it was formed, to give it sufficient consistency to remove it therefrom, were all well known, and in public and successful use, and among others, the same were known to and used by William Fosket, now of Meriden, Connecticut, and Benjamin L. Steadman, of the town of Meriden, Connecticut, at Ware and other places in its vicinity, and at Boston, in the State of Massachusetts.

And this defendant further answering says, that he has not used any machinery or process, or parts thereof, in Danbury, or since the surrender of the original patent to said Wells,
209 which is described or referred to in any of the aforesaid Wells patents, except such common parts and things as were well known and public property long prior to the time of the said supposed invention of said Wells; and that he has not so used and employed any machinery or process which is covered or secured by, or is an infringement upon, either of the aforesaid re-issued patents.

And this defendant further answering says, that the acts and proceedings of said complainants have greatly interfered
210 with his business, and damaged him, and that he has not yet made any profits in running machinery at said Danbury, or in manufacturing hat bodies at that place. And he says that he has never infringed, or intended to infringe, any right of said complainants; and he believes that he has a perfect right to make hat bodies as he has done at Danbury, and is fully able to respond to the complainants in any amount of damages which they will ever recover against him for manufacturing hat bodies as he has done at Danbury.

And this defendant prays a trial by jury of the various
211 issues of fact formed by this answer, and of those which shall be formed by the filing of the re-application thereto.

And he prays the benefit of as much of his answer as goes in bar of the said bill, the same as if such matter had been pleaded thereto, and he humbly submits and insists, that under the facts and circumstances above stated, the said complainants have no right to a writ of injunction as moved for in said bill, and no further answers to said bill than are herein given, and he prays to be hence dismissed, with his reasonable costs and charges, in this be-
212 half most wrongfully sustained.

G. E. COWPERTHWAITE.

R. S. BALDWIN,
Solicitor and of Counsel.
GEO. CLIFFORD,
Of Counsel.

UNITED STATES OF AMERICA,
District of Connecticut, ss.

On this 14th day of April, 1857, before me came George E. Cowperthwaite, the defendant in the foregoing answer, and by whom the same is subscribed, and being by me duly sworn, de-
213 poses and says, that he has read the foregoing answer, and knows the contents thereof, and that the same is true of his own knowledge, except to the matters which are therein stated to be upon his information and belief, and that as to those matters he believes it to be true.

ALFRED BLACKMAN,
Clerk.

The foregoing is a true copy of the original on file in this office. Office of the circuit court of the United States for the district of Connecticut, New Haven, 18th April 1857.

214 Attest: ALFRED BLACKMAN,
Clerk.

Deposition to prove the contents of the missing Exhibit F.

Q. 1. State your name, age, residence, and occupation.

A. My name is Daniel Barnum, aged 58 years, reside in Jersey City, and am engaged in no particular business.

Q. 2. Did you have in your possession at any time a letter addressed to Rufus Brown, and signed William Fosket?

215 A. I did.

Q. 3. About how long was that letter in your possession?

A. I should think three or four days.

Q. 4. Did you read it: and if yea, about how often?

A. I should think I read it about four or five times.

Q. 5. Did you pay attention, and if yea, what attention, to its contents and phraseology?

216 A. I did pay attention, and particular attention, to its contents and phraseology.

Q. 6. Were you present during the cross-examination of William Fosket as a witness in this cause?

A. I was.

Q. 7. Do you know if that letter was produced and given in evidence by me during such cross-examination?

A. I do.

Q. 8. Do you remember the contents of said letter? and if yea, state such contents and phraseology as near as you can re-
217 member.

A. I do remember the contents, and am ready to produce, and do produce, such contents in writing, marked F, which writing contains, according to my best recollection, the phraseology and contents of said letter.

DANIEL BARNUM

Sworn to before me this 30th Oct., 1857.

R. E. STILWELL,
U. S. Commissioner.

Exhibit F[1].

MERIDEN, *Dec. 3d*, 1856.

218 FRIEND RUFUS: I desire to convey the whole of our hat patent to Elbridge Brown. I believe the term of the patent runs to or expires in 1860, and if in this brief period it can be made available, so that he will reward me, I will pay you three-quarters of all I may thus receive for it, or more if you desire it.

I believe you hold three-quarters, and I herewith enclose a blank deed which you will please sign and return to me.

You will probably receive a letter from Mr. Brown on the subject.

WILLIAM FOSKET.

219 To RUFUS BROWN,
Palmer, Three Rivers, Mass.

Exhibit "G."

Whereas William Fosket, of Meriden, Conn., did obtain letters-patent of the United States for a certain machine for forming hat bodies, which patent is dated the day of , 1846; and whereas I have acquired three-fourths of the rights and invention secured by said letters-patent; and whereas I am desirious of reconveying the same to said Fosket, the original patentee: Now, therefore, in consideration of the sum of dollars, received
220 to my full satisfaction, I hereby sell, assign, and set over to said Fosket, all my right, title, and interest in and to said invention, secured by said letters-patent.

In witness whereof I have hereunto set my hand and seal the day of

K. G. W., [L. S.]
U. S. Com.

Exhibit X.

221 Know all men by these presents, that we, George E. Cowperthwaite, of Danbury, in the State of Connecticut, and Alva B. Taylor, of Newark, in the State of New Jersey, are held and firmly bound and obliged unto Rufus Brown, of Palmer, in the State of Massachusetts, in the full sum of one thousand dollars, which sum, well and truly to be paid to the said Brown, his heirs, executors, administrators, and assigns, we do hereby bind ourselves, our heirs, executors, administrators, and as-
222 signs, and every of them, by these presents. Sealed with our seals, and dated this 10th day of December, A. D. 1856.

The condition of the foregoing obligation is such, that whereas the said Brown has, on the day of the date hereof, assigned to said Cowperthwaite all the right, title, and interest which he, the said Brown, has or had in an invention secured by letters-patent, bearing date the day of , in the year A. D. 1846, to William Fosket, of Ware, in the county of Hampshire, Massachusetts, for a machine for forming hat bodies, in consideration of which, or in part consideration of which assignment, said Cowperthwaite promises and agrees to pay said Brown within, or at the expiration of, two years from date, the sum of five hundred dollars, or re-convey or re-assign to said Rufus Brown all rights acquired by virtue of said assignment by said Cowperthwaite in and to said invention or letters-patent:

223

Now, therefore, be it known, that if said Cowperthwaite shall pay said Brown the said sum of five hundred dollars within two years from date, or if the said Cowperthwaite shall elect not to pay said sum, and in such case shall reconvey or reassign to said Brown all rights, title, and interest said Cowperthwaite may have in the invention aforesaid, by virtue of said assignment from said Brown, or under the same, and said re-assignment shall be made within or at the expiration of two years from the date of this bond, then the foregoing obligation is to be void and of no effect; otherwise to be and remain in full force and effect forever.

224

G. E. COWPERTHWAITE,
ALVA B. TAYLOR.

225

Signed, sealed, and delivered in presence of—
CALVIN TORNEY.

Know all men by these presents, that I, Rufus Brown, of Palmer, in the county of Hampshire, and Commonwealth of Massachusetts, the obligee of the within bond, in consideration of five hundred dollars to me in hand paid, the receipt whereof is hereby acknowledged, do hereby assign and transfer to Israel D. Condit, of Milburn, in the State of New Jersey, all my rights and interests under the foregoing bond, hereby authorizing the said Israel D. Condit to demand and receive all sums of money due and that may become due me under the same, and in case of failure or neglect of said obligors to comply with the conditions of payment therein mentioned, to demand and receive the reconveyance of all the interest in the said invention before named, that was originally assigned by me to the said obligors, and to do any and all other acts that I might or could do in the premises.

226

Witness my hand and seal, this 28th day of August, A. D. 1857.

227

RUFUS BROWN.

Executed in presence of—
JAMES G. ALLEN.

240

Reissue—No. 396.

The United States of America, to all to whom these Letters Patent shall come:

Whereas Charles St. John, Henry A. Burr, Albert H. Wright, and James M. Riblet, of New York, N. Y., assignees of Henry A. Wells, deceased, have alleged that said Wells did, in
228 his lifetime, invent a new and useful improvement in machinery for making hat bodies, (for which letters patent were issued to said Wells, dated 25th April, 1846, which letters having been surrendered by said assignees, the same have been cancelled, and new letters ordered to issue to them, on an amended specification,) which said Wells stated had not been known or used before his application, he having made oath that he was a citizen of the United States; that he did verily believe that he was the original and first inventor or discoverer of the said improvement; and that the same had not, to the best of his knowledge
229 and belief, been previously known or used; said assignees having paid into the treasury of the United States the sum of fifteen dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose:

These are therefore to grant, according to law, to the said Charles St. John, Henry A. Burr, Albert H. Wright, and James M. Riblet, their heirs, administrators, or assigns, for the term of fourteen years from the said twenty-fifth day of April, one
230 thousand eight hundred and forty-six, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said assignees, in the schedule hereunto annexed, and is made a part of these presents.

In testimony whereof, I have caused these letters to be made patent, and the seal of the Patent Office has been hereunto affixed.

Given under my hand at the city of Washington, this
231 thirtieth day of September, in the year of our Lord one thousand eight hundred and fifty-six, and of the independence of the United States of America the eighty-first.

Countersigned and sealed with the seal of the Patent Office.

[L. S.]

GEORGE C. WHITING.
Acting Secretary of the Interior.

C. MASON,
Commissioner of Patents.

232

The Schedule referred to in these Letters Patent, and making part of the same.

To all whom it may concern:

Be it known, that Henry A. Wells, late of the city, county, and State of New York, now deceased, did, in his lifetime, invent certain new and useful improvements in the process of and machinery for making hat bodies of fur, for which said improvements letters patent of the United States were granted to the said Wells,
233 bearing date the 25th day of April, 1846, of which the following is a full, clear, and exact description of the principle or character which distinguishes the said invention from all other things before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this description, in which figure 1 is a plan of the machine; figure 2, a longitudinal, vertical section; and figure 3, a longitudinal elevation. The
234 other figures will be described in their appropriate places. The same letters indicate like parts in all the figures.

It has long been essayed to make hat bodies by throwing the fibres of fur, wool, etc., by a brush or picker cylinder, on to a perforated cone, exhausted by a fan below, to carry and hold the fibres thereon by the currents of air that rush from all directions towards and through the apertures of the cone, and thus form a bat of fibres ready for hardening and felting; but from various causes all these attempts have failed. Hat bodies are required to be made thick at and near the rim, and thin along the crown and
235 tip, that the required strength may be given where it is required, without making the hat too heavy, and at too great a cost of material. This disposition of the fur can be obtained by the skill and judgment of the workman by the hand process, known under the name of "bowing," but cannot by the plan above referred to, for the reason that the fibres are only controlled by the currents induced through the apertures of the cone, or other
236 form, by the exhaust, instead of being thrown and properly directed for distribution, on to the cone or other form. When the fibres are not properly thrown and directed, but are drawn to the surface by the action of the exhaust, the force thus induced gradually decreases as the apertures in the cone are closed up by the accumulation of the fur deposited on the outer surface thereof, and in consequence of the impelling force, which carries the fibres, becomes insufficient to control the force of gravity which will then prevail, and cause the fibres to accumulate to a
237 greater thickness on the tip of the cone, where much less is required than below. And the said suggested plan cannot produce a practical result, for the further reason that there is no mode

described by which the bat of fur fibres can be hardened while on the cone, that it may be removed from such cone preparatory to the after and well-known process of sizing or felting.

The invention of the said Henry A. Wells, by which the required and much-desired practical result was obtained, consists in

238 forming the bat of fur fibres by throwing the fur, in properly regulated quantities, against a section of the circumference of a perforated cone or other form, as the same is rotated, to present, in succession, every part of the circumference thereof to the current of impelled fur, and thereby obtained the required thickness of bat, when this is combined with the holding of the fibres on to the cone during the operation, by the pressure of the surrounding atmosphere, induced by exhausting the air from within the said perforated cone or other form.

In the accompanying drawings (*a*) is a frame properly

239 adapted to the operative parts of the machine, and (*b*) the lower feed-apron, on which the stock is spread, by the attendant, in separate parcels, each sufficient for the formation of a hat, according to its intended weight. This apron, or endless belt of cloth, or other suitable material, passes around a roller (*c*) and a lip (*d*); the former at the back of the machine, with its bearings in sliding boxes governed by set screws (*ee*) for the purpose of tightening the apron; and the latter near to the rotating brush (*f*), and so formed as to present a slightly rounded edge for the apron

240 to pass over where it presents the fur to the action of the brush. Instead of this slightly rounded edge, a small metallic rolller may be substituted; but when this is done the roller should be supported at different points between its end journals, and this he effected by letting it run in a circular groove in the lip, as represented in section at figure 4, where (*g*) indicates this roller. The fur, as it is carried along towards the lip (*d*), is gradually compressed by the upper apron (b^1), which passes around

241 a feed-roller (c^1) and lip (d^1), in manner similar to the under feed-apron. The roller (c^1) runs in a frame (*i*), of which the lip (d^1) forms part, hung on journals that rest in standards (*j*,) so that the lip (d^1) can be made to press on to the fur between it and the under lip (*d*), and thus gripe the fibres and present them to the effective action of the brush (*f*). The under plane of the upper apron (b^1) is inclined to the upper plane of the lower one (*b*), the more effectually to present the fibres in the proper manner to the brush.

The roller (c^1) of the upper apron runs in sliding boxes, governed by set screws (e^1e^1), and is placed forward of the jour-

242 nals of the frame, so that the tension of the belt (i^2), which communicates motion from the lower roller (*c*) to the upper one (c^1), may press the upper lip (d^1) on the under lip (*d*); but this may be effected by means of springs, weights, or other well

known mechanical devices for making pressure, under similar circumstances.

The fibres as they pass from the feed-aprons are acted upon by a brush (*f*) that rotates with great velocity, and which is composed of parallel rows of stiff bristles projecting from a cylin-
243 der, but which may be differently constructed and composed if desired. As the fibres are first presented, they are brushed and properly laid by the downward action of the brush, as indicated by the arrow, and when liberated are carried down the curved surface (*l*) of a chamber or tunnel (*m*); and at the lower edge of this they meet a current of air, that enters a narrow aperture (*n*), near the bottom of the chamber, and extending the whole length of the brush, which being induced by the rotation of the brush
244 and the partial vacuum in a perforated cone, prevents the fibres of fur from falling and resting on the bottom of the chamber, and carries them on to the perforated cone (*o*). This chamber extends over and under the brush and the forward part of the lips, and turns on the journals of the brush. or is otherwise so arranged as to have a slight motion, the axis of which is the same as that of the brush. Its bottom rests on a set screw (*p*) to regulate the delivery end of the chamber relatively to the cone. Its forward end, in addition to this, is provided with a hinged flap (*q*), regulated by a cam lever as a means of regulating the de-
245 livery of the fibres. Its top (*r*) is gradually elevated, and sides contracted, to make the delivery aperture nearly of the form of the cone, but narrower and higher. And its upper part is provided with a hood (*s*), so curved as to correspond generally with the curve of the tip of the cone. This hood is hinged to the upper part of the delivery aperture of the chamber, and is connected with an eccentric (*t*) by means of a cord (*u*) and bell-crank (u^1), that passes over a pulley (r^{11}), so that each revolution of this eccentric carries the hood up and down to direct the dis-
246 charge and distribute the fibres on to the cone, a greater thickness being desirable in the parts of the bat which form the brim, than on the tip and crown; and when it is desired still further to diversify the distribution of the fibres, a cam can be substituted for the eccentric, and the connection between it and the hood is formed as represented in section at figure 5, where the cam (*t*) acts on a lever (t^1), connected with the hood (*s*) by the cord (*u*).

The cone (*o*) is made in the usual manner, but of thin
247 sheet-metal, perforated, instead of wire gauze. Its lower edge fits in a metallic ring (*w*), that runs in an appropriate collar in the upper part of a case (*x*), and its outer periphery is provided with cogs that mash into the cogs of a pinion (*y*), concealed in the drawing by the pulley (d^2), on a vertical shaft (*z*), by which a slow rotary motion is given to the cone, as the fibres are thrown on to it, to distribute them equally all around the cone. The case

(x) is sufficiently long to receive two rings (w), one on each side of the pinion (y), by which both are kept in motion, and it, the
248 case, is made to swivel on a hollow collar (f^1), to which its bottom is fitted, so that when one cone is covered it may be turned aside by turning the case half a revolution, and another cone put on to the other ring, that another bat may be in the process of forming, whilst the one already formed may be prepared for the hardening process in the manner to be hereafter described.

The case (x) communicates, through the hollow collar (f^1),
249 with an exhausting fan-blower (g^1), which consists of a vertical arbor (h^1), with oblique vanes (i^1), so that when rotating with great velocity in the direction of the arrow, the air is exhausted from the case (x), and the perforated cone (o). When one of the cones is removed from one of the rings (w), to be taken to the hardening apparatus, the aperture in the ring (w) must be closed up with a cap-plate (w^2) to prevent the access of air. Any other mode of exhausting the case and cone may be employed, but this is the most efficient which he (Wells) essayed.

The preparation of the formed bat for hardening is effect-
250 ed by covering it with pieces of felt or fulled cloth just taken from hot water, and this is done in the following manner, namely: The attendant takes from a kettle of hot water a piece of felt cloth, rolled up on a roller, and applies one end of it to the surface of the bat, and as the cone rotates, the felt cloth winds from the roller on to the bat on the cone. Another piece of felt cloth is put on the top, and then a strong perforated metallic cone (k^1)—see figure 6—is put over the whole, the more effectually to hold the fibres of the bat, and to make a slight pressure on them whilst it is immersed in hot water to harden. As the perfo-
251 rated cone (o) is better when made very thin, the pressure of the water when drawing it out of the kettle, after the bat has been hardened, tends to and would collapse it, and therefore to prevent this another perforated metallic cone (l^1)—see figure 7—is put inside (before the whole is immersed in hot water), to sustain the pressure in drawing the whole out of the hardening-kettle. The relative situation of the three cones, the bat and the covering felt cloth, preparatory to the hardening process, is represented on an enlarged scale at figure 8, which is a vertical section through
252 the whole. The inner sustaining cone may be dispensed with, if desired, by making the cone (o) of greater thickness and strength.

All the operative parts may be set in motion by any of the known means, such as belts, as fully represented in the accompanying drawings, in which (m^1) is a main line shaft overhead, driven by any first mover. From a wheel (n^1) on it a band (o^1) ex-

tends to a pulley (p^1) on the shaft of the brush, which should make about two thousand revolutions per minute, more or
253 less. From another wheel (q^1) on this same shaft, a band (r^1) extends to a pulley (s^1), on the shaft of which there is a wheel (t^{11}) that drives the exhaust-fan (g^1) by the belt (u^{11}). And from a pulley (v^1) on the same line shaft a belt extends to a wheel (w^1), on the shaft of which there is a pulley (x^1), from which extends another belt (y^1) to a wheel (z^1) on the shaft (a^2), that carries the eccentric (f), to give all the reduced motions required for the other parts of the machinery. From a wheel (b^2) on this shaft a belt (c^2) extends to a pulley (d^2) on the shaft (z) that
254 rotates the cone (o). And another pulley (e^2) drives the wheel (f^2) of the feed-roller (c), by the belt (g^2), and on the other end of the axle of this feed-roller there is a pulley (h^2) which drives, by a cross-belt (i^2), the upper feed-roller (c^1). If desired, an alarm can be connected with the feed-roller of the lower apron to announce to the attendant when each charge of stock is exhausted, that the cones may be shifted. This can be done by connecting the arbor of the feed-roller (c) of the lower feed-apron by a belt, with a wheel (k^2) provided with a cam or pin to
255 lift, at every revolution, the hammer (l^2) of a bell (m^2), the striking of which shall give requisite indication.

It will be obvious from the foregoing that the hood may be operated by hand instead of machinery; thus substituting the attention, skill, and cost of an operative for the positive regularity and cheapness of mechanical movements. It may be well to add, as a mere matter of precaution, that this invention is not limited to the making of hat bodies, but to the making of bats on formers of any other shape or configuration, the form of the delivery aperture of the chamber and the hood, and the movements of the latter, be-
256 ing properly adapted to the change of form of the perforated mould or former with the restrictions indicated.

Having thus described the mode of application of the said invention of the said Henry A. Wells, as the same was successfully reduced to practice by him, we do not wish to be understood as limiting the claim of invention to such mode of application, as other modes may be devised operating on the same principle, or having the same mode of operation, and only differing therefrom in the substitution of equivalent means.

What is claimed herein as the invention of the said Henry
257 A. Wells, deceased, is forming bats of fur fibres by throwing the fur in properly regulated quantities, substantially as herein described, against a section of the circumference of a perforated cone or other form, as the same is rotated, to present in succession every part of the circumference thereof to the current of impelled fur to obtain the required thickness of bat, substantially as described,

in combination with the method of holding the fibres on to the cone,
or other form, during the operation, substantially as described
258 and for the purpose specified.

CHARLES ST. JOHN,
H. A. BURR,
A. H. WRIGHT,
JAMES M. RIBLET.

WM. H. BISHOP,
CHAS. A. WILSON,
Witnesses.

Reissue—No. 400.

The United States of America, to all to whom these Letters Patent shall come:

Whereas Charles St. John, Henry A. Burr, Albert H.
259 Wright, and James M. Riblet, of New York, N. Y., assignees of Henry A. Wells, deceased, have alleged that said Wells did, in his lifetime, invent a new and useful improvement in manufacturing hat bodies, (for which letters patent were issued to said Wells, dated 25th April, 1846; which letters having been surrendered by said assignees, the same have been cancelled, and separate letters patent ordered to issue to them, on an amended specification,) which said Wells stated had not been known or used before his application, he having made oath that he was a citizen of the United States; that he did verily believe that he was the original and first inventor or discoverer of the said improvement,
260 and that the same had not, to the best of his knowledge and belief, been previously known or used; said assignees having paid into the treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose.

These are therefore to grant, according to law, to the said Charles St. John, Henry A. Burr, Albert H. Wright, and James
261 M. Riblet, their heirs, administrators, or assigns, for the term of fourteen years from the said twenty-fifth day of April, one thousand eight hundred and forty-six, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said assignees, in the schedule hereunto annexed, and is made a part of these presents.

In testimony whereof, I have caused these letters to be
262 made patent, and the seal of the Patent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this seventh day of October, in the year of our Lord one thousand
[L. S.] eight hundred and fifty-six, and of the independence of the United States of America the eighty-first.

Countersigned and sealed with the seal of the Patent Office.

GEO. C. WHITING,
Acting Secretary of the Interior.

263 C. MASON,
Commissioner of Patents.

The Schedule referred to in these Letters Patent, and making part of the same.

To all whom it may concern:

Be it known, that Henry A. Wells, late of the city, county, and State of New York, now deceased, did, in his lifetime, in-
264 vent certain new and useful improvements in the process of, and machinery for, making hat bodies of fur, for which said improvements letters patent of the United States were granted to the said Wells, bearing date the 25th day of April, 1846, of which the following is a full, clear, and exact description of the principle or character which distinguishes the said invention from all other things before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this description, in which
265 figure 1 is a plan of the machine; figure 2, a longitudinal, vertical section; and figure 3, a longitudinal elevation. The other figures will be described in their appropriate places. The same letters indicate like parts in all the figures.

It has long been tried to make hat bodies by throwing the fibres of fur, wool, etc., by a brush or picker cylinder, on to a perforated cone, exhausted by a fan below, to carry and hold the fibres thereon by the currents of air that rush from all directions towards and through the apertures of the cone, and thus form a
266 bat of fibres ready for hardening and felting; but from various causes all these attempts have failed. Hat bodies are required to be made thick at and near the rim, and thin along the crown and tip, that the required strength may be given where it is required, without making the hat too heavy, and at too great a cost of material. This disposition of the fur can be obtained by the skill and judgment of the workman by the hand process, known under the name of "bowing," but cannot by the plan above referred to, for the reason that the fibres are only controlled by the currents induced through the apertures of the
267 cone, or other form, by the exhaust, instead of being thrown, and properly directed for distribution, on to the cone or other form. When the fibres are not properly thrown and directed,

but are drawn to the surface by the action of the exhaust, the force thus induced gradually decreases as the apertures in the cone are closed up by the accumulation of the fur deposited on the outer surface thereof, and in consequence the impelling force, which carries the fibres, becomes insufficient to control the force of gravity, which will then prevail, and cause the fibres to accu-
268 mulate to a greater thickness on the tip of the cone, where much less is required than below. And the said suggested plan cannot produce a practical result, for the further reason that there is no mode described by which the bat of fur fibres can be hardened while on the cone, that it may be removed from such cone preparatory to the after and well-known process of sizing or felting.

The invention of the said Henry A. Wells, by which the required practical result was obtained, consists in forming the bat of fur fibres on a perforated cone, or other form, in the manner substan-
269 tially as above described, in combination with the hardening of such bat while on such cone, or other form, to give it the required consistency to admit of taking it off in a suitable condition for sizing by the well-known process of felting.

In the accompanying drawings (*a*) is a frame properly adapted to the operative parts of the machine, and (*b*) the lower feed apron, on which the stock is spread, by the attendant, in separate parcels, each sufficient for the formation of a hat, according to its in-
270 tended weight. This apron, or endless belt of cloth, or other suitable material, passes around a roller (*c*) and a lip (*d*); the former at the back of the machine, with its bearings in sliding boxes governed by set screws (*ee*) for the purpose of tightening the apron; and the latter near to the rotating-brush (*f*), and so formed as to present a slightly rounded edge for the apron to pass over where it presents the fur to the action of the brush. Instead of this slightly rounded edge, a small metallic roller may be substituted; but when this is done, the roller should be
271 supported at different points between its end journals, and this he effected by letting it run in a circular groove in the lip, as represented in section at figure 4, where (*g*) indicates this roller. The fur, as it is carried along towards the lip (*d*), is gradually compressed by the upper apron (b^1), which passes around a feed-roller (c^1), and lip (d^1), in manner similar to the under feed-apron. The roller (c^1) runs in a frame (*i*)—of which the lip (d^1) forms part—hung on journals that rest in standards (*j*), so that the lip (d^1) can be made to press on to the fur between it and the under lip (*d*), and thus gripe the fibres and
272 present them to the effective action of the brush (*f*). The under plane of the upper apron (b^1) is inclined to the upper plane of the lower one (*b*), the more effectually to present the fibres in the proper manner to the brush.

The roller (c^1) of the upper apron runs in sliding boxes, governed by set screws (e^1 e^1), and is placed forward of the journals of the frame, so that the tension of the belt (i^2), which communicates motion from the lower roller (c) to the upper one (c^1), may press the upper lip (d^1) on the under lip (d); but this may
273 be effected by means of springs, weights, or other well known mechanical devices for making pressure under similar circumstances.

The fibres, as they pass from the feed-aprons, are acted upon by a brush (f) that rotates with great velocity, and which is composed of parallel rows of stiff bristles projecting from a cylinder, but which may be differently constructed and composed, if desired. As the fibres are first presented they are brushed and properly laid, by the downward action of the brush, as indicated by the arrow, and when liberated are carried down the curved surface
274 (l) of a chamber or tunnel (m); and at the lower edge of this they meet a current of air—that enters a narrow aperture (n), near the bottom of the chamber, and extending the whole length of the brush—which being induced by the rotation of the brush and the partial vacuum in a perforated cone, prevents the fibres of fur from falling and resting on the bottom of the chamber, and carries them on to the perforated cone (o). This
275 chamber extends over and under the brush and the forward part of the lips, and turns on the journals of the brush, or is otherwise so arranged as to have a slight motion, the axis of which is the same as that of the brush. Its bottom rests on a set screw (p) to regulate the delivery-end of the chamber relatively to the cone. Its forward end, in addition to this, is provided with a hinged flap (q), regulated by a cam lever, as a means of regulating the delivery of the fibres. Its top (r) is gradually elevated and sides contracted to make the delivery-aperture nearly of the form of the cone, but narrower and higher; and its upper part
276 is provided with a hood (s) so curved as to correspond generally with the curve of the tip of the cone. This hood is hinged to the upper part of the delivery-aperture of the chamber, and is connected with an eccentric (t) by means of a cord (u) and bell-crank (u^1) that passes over a pulley ($r^{1\,1}$), so that each revolution of this eccentric carries the hood up and down to direct the discharge and distribute the fibres on to the cone—a greater thickness being desirable in the parts of the bat which form the brim than on the tip and crown; and when it is desired still
277 further to diversify the distribution of the fibres, a cam can be substituted for the eccentric, and the connection between it and the hood is formed as represented in section at figure 5, where the cam (t) acts on a lever (t^1), connected with the hood (s) by the cord (u).

The cone (o) is made in the usual manner, but of thin sheet-

metal, perforated, instead of wire-gauze. Its lower edge fits in a metallic ring (w), that runs in an appropriate collar in the upper part of a case (x), and its outer periphery is provided with
278 cogs that mash into the cogs of a pinion (y)—concealed in the drawing by the pulley (d^2)—on a vertical shaft (z), by which a slow rotary motion is given to the cone, as the fibres are thrown on to it, to distribute them equally all around the cone. The case (x) is sufficiently long to receive two rings (w), one on each side of the pinion (y), by which both are kept in motion, and it—the case—is made to swivel on a hollow collar (f^1), to which its bottom is fitted, so that when one cone is covered it may be turned aside by turning the case half a revolution, and another cone put on to the other ring, that another bat may be in
279 the process of forming, whilst the one already formed may be prepared for the hardening process in the manner to be hereafter described.

The case (x) communicates through the hollow collar (f^1), with an exhausting fan-blower (g^1), which consists of a vertical arbor (h^1), with oblique vanes (i^1), so that when rotating with great velocity in the direction of the arrow, the air is exhausted from the case (x) and the perforated cone (o). When one of the cones is removed from one of the rings (w), to be taken
281 to the hardening apparatus, the aperture in the ring (w) must be closed up with a cap-plate (w^2) to prevent the access of air. Any other mode of exhausting the case and cone may be employed, but this is the most efficient which he (Wells) essayed.

The preparation of the formed bat for hardening is effected by covering it with pieces of felt or fulled cloth, just taken from hot water, and this is done in the following manner, namely: the attendant takes from a kettle of hot water a piece of felt cloth, rolled upon a roller, and applies one end of it to the surface of
281 the bat, and as the cone rotates, the felt cloth winds from the roller on to the bat on the cone. Another piece of felt cloth is put on the top, and then a strong perforated matallic cone (k^1)—see figure 6—is put over the whole, the more effectually to hold the fibres of the bat, and to make a slight pressure on them whilst it is immersed in hot water to harden. As the perforated cone (o) is better when made very thin, the pressure of the water when drawing it out of the kettle, after the bat has been hardened, tends to, and would collapse it, and therefore, to prevent this, another
282 perforated metallic cone (l^1)—see figure 7—is put inside, (before the whole is immersed in hot water,) to sustain the pressure in drawing the whole out of the hardening kettle. The relative situation of the three cones, the bat and the covering felt cloth, preparatory to the hardening process, is represented on an enlarged scale at figure 8, which is a vertical section through the whole. The inner sustaining cone may be dispensed with, if desired, by making the cone (o) of greater thickness and strength.

All the operative parts may be set in motion by any of the
283 known means, such as belts, as fully represented in the accompanying drawings, in which (m^1) is a main line shaft, overhead, driven by any first mover. From a wheel (n^1) on it, a band (o^1) extends to a pulley (p^1) on the shaft of the brush, which should make about two thousand revolutions per minute, more or less. From another wheel (q^1), on this same shaft, a band (r^1) extends to a pulley (s^1), on the shaft of which there is a wheel (t^{11}), that drives the exhaust fan (g^1) by the belt (u^{11}). And
284 from a pulley (v^1) on the same line shaft, a belt extends to a wheel (w^1), on the shaft of which there is a pulley (x^1), from which extends another belt (y^1) to a wheel (z^1) on the shaft (a^2)—that carries the eccentric (t)—to give all the reduced motions required for the other parts of the machinery. From a wheel (b^2) on this shaft, a belt (c^2) extends to a pulley (d^2) on the shaft (z) that rotates the cone (o). And another pulley (e^2) drives the wheel (f^2) of the feed-roller (c) by the belt (g^2), and on the other end of the axle of this feed-roller there is a pulley (h^2) which drives by a cross-belt (i^2) the upper feed-roller (c^1). If desired, an alarm
285 can be connected with the feed-roller of the lower apron to announce to the attendant when each charge of stock is exhausted, that the cones may be shifted. This can be done by connecting the arbor of the feed-roller (c) of the lower feed-apron, by a belt, with a wheel (k^2) provided with a cam or pin, to lift, at every revolution, the hammer (l^2) of a bell (m^2), the striking of which shall give requisite indication.

It will be obvious from the foregoing, that the hood may
286 be operated by hand instead of machinery, thus substituting the attention, skill, and cost of an operative for the positive regularity and cheapness of mechanical movements. It may be well to add, as a mere matter of precaution, that this invention is not limited to the making of hat bodies, but to the making of bats on formers of any other shape or configuration, the form of the delivery aperture of the chamber and the hood, and the movements of the latter, being properly adapted to the change of form of the perforated mould or former, with the restrictions
287 indicated.

Having thus described the mode of application of the said invention of the said Henry A. Wells, as the same was successfully reduced to practice by him, we do not wish to be understood as limiting the claim of invention to such mode of application, as other modes may be devised, operating on the same principle, or having the same mode of operation, and only differing therefrom in the substitution of equivalent means.

What we claim as the invention of the said Henry A. Wells, deceased, in the process of making fur hat bodies, is the forming of the bat of fur fibres on a perforated cone, or other form, in man-

ner substantially as described, in combination with the hard-
288 ening of such bat, while on such cone, or other form, to give it the required consistency to admit of taking it off in a suitable condition for sizing by the well known process of felting, substantially as described.

CHARLES ST. JOHN,
H. A. BURR,
A. H. WRIGHT,
289 JAMES M. RIBLET.

WM. H. BISHOP,
ALEX. PORTER BROWNE,
Witnesses.

No. 4,962.

The United States of America, to all to whom these Letters Patent shall come:

Whereas A. B. Taylor and H. A. Burr, New York, have alleged that they have invented a new and useful improvement in
290 machinery for making hat bodies, which they state has not been known or used before their application, have made oath that they are citizens of the United States; that they verily believe that they are the original and first inventors or discoverers of the said improvement, and that the same hath not, to the best of their knowledge and belief, been previously known or used; have paid into the treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents,
291 signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent be granted for that purpose:

These are therefore to grant, according to law, to the said A. B. Taylor and H. A. Burr, their heirs, administrators, or assigns, for the term of fourteen years from the ninth day of February, one thousand eight hundred and forty-seven, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a descrip-
292 tion whereof is given in the words of the said Taylor & Burr, in the schedule hereunto annexed, and is made a part of these presents.

In testimony whereof, I have caused these letters to be made patent, and the seal of the Patent Office has been hereunto affixed.

Given under my hand at the city of Washington, this ninth day of February, in the year of our Lord one thousand eight
[L. S.] hundred and forty-seven, and of the independence of the United States of America the seventy-first.

Countersigned and sealed with the seal of the Patent Office.

293

JAMES BUCHANAN,
Secretary of State.
EDMUND BURKE,
Com'r of Patents.

The Schedule referred to in these Letters Patent, and making part of the same.

To all to whom these presents shall come:

Be it known, that we, Alva B. Taylor and A. B. Burr, of the city, county, and State of New York, have invented certain new and useful improvements in the machine for making or set-
294 up hot hat bodies, and that the following is a full, clear, and exact description of the principle or character which distinguishes it from all other things before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which figure 1 is a longitudinal vertical elevation; figure 2, a cross vertical section taken at the line (XX) of figure 1, looking in the direction of the arrow; figure 3, a plan of the machine with the perforated former removed, and figure 4 a
295 longitudinal vertical section taken at the line (ZZ) of figure 3. The same letters indicate like parts in all the figures.

Our invention is for improvements on the method of forming hat bodies by throwing the fur or other fibres on to an exhausted perforated cone placed in front of a trunk or tunnel, which receives the fur from the rotating brush or picker, and guides the delivery of it on to the perforated cone. Our first improvement consists in making the sides of this trunk of thin sheet-metal or other
296 substance, which can be readily and easily bent to the desired form, so that the aperture or mouth of the trunk, which directs the deposit of the fur, etc., on to the perforated cone or former, can be changed at pleasure to increase or decrease the deposit of fur on any part of the former, as it may be desired, to increase or reduce the thickness of any part of the hat. This object, which is of great importance in the manufacture of hats, has been atttempted, by providing the mouth of the trunk with a jointed hood, which can be depressed or elevated; but it is found in practice that this does not regulate this distribution so
297 effectually as our improved method, for any desired curve can be given to the sides, to give a gradual enlargement or contraction to any part.

Our second improvement consists in making the top of the trunk so that the end towards the former can be depressed or elevated at

pleasure, the back end being the axis of this motion, by means of which the mouth of the trunk can be adapted to any size of former, and yet have the top of the trunk present an unbroken plane, to avoid catching and retaining the fibres, or the forming of
298 eddies in the current of air that passes through the trunk, tending to interrupt the direct passage of the fibres from the brush to the former. The top being so formed as to embrace the pliable sides, that the upper part of the trunk may always be of the same size, irrespective of the position of the top.

Our third improvement consists in providing the aperture at the back of the trunk, and below the feed-rollers and brush, with a valve, or shutter, for the purpose of closing this aperture to
299 prevent the passage of a strong current of air through the trunk at the commencement of each operation, and until the perforated former is covered with a film of fibres, by means of which the forming of welts or air-bubbles in the bat is effectually prevented. At the commencement of the operation, and before the perforations in the former are partly closed by the deposit of fibres, it will be obvious that the exhausting-fan in the former will produce a much stronger current of air through the trunk than when the perforations are partly closed, and that, therefore, the fibres will be thrown on to the former at the commencement
300 of the operation; this, it is found by experience, produces counter currents, which throw up the first film or fibres from the surface of the former, and thus forms welts, or protuberances, which are very injurious to the bat. But by closing the aperture at the back of the trunk, the fibres are at first deposited by a gentle current and pressure, and after a film completely surrounds the former, the opening of the valve, or shutter, admits the current, that the fibres may be thrown on with more force to complete the bat.

And our fourth improvement consists in the employment
301 of one, two, or more rollers, covered with cloth or like substance, below the feed-rollers, the rotation of which, in connection with the brush, has the effect to brush, comb, or otherwise straighten the fibres before they are thrown by the brush and carried to the former.

In the accompanying drawings, (*a*) represents a frame of the usual or any desired construction, and (*b*) an exhausting-fan with a chamber (*c*), over which is placed the perforated former of any desired form, and in front of the aperture (*d*) of the trunk
302 (*e*), which runs back to, and is connected with the case (*f*), that surrounds the upper part of the rotating brush (*g*). The bottom (*h*) of this trunk is flat, and gradually narrowed from the brush to the mouth, and to the edges of this are properly secured the sides (*ii*) of the trunk, which are made of sheet copper, sufficiently thin to admit of bending with facility, so that the

mouth (*d*) of the trunk can receive any desired shape, and can at any time be changed to regulate the deposit of the fibres on to the former, for if the sides be bent, so as to give the form repre-
303 sented by dotted lines in figure 2, it will be obvious that the lower part of the bat will receive a greater quantity of fibres in proportion to the middle than if formed as represented by the full lines, so that by this means the attendant can alter the shape of the mouth to increase or decrease to any extent desired the deposit of the fibres on to any part of the former, and thus increase or decrease the strength of any desired part of the hat. The curve given to the sides at the mouth should be gradually run along the sides, until the curves are lost, to prevent any sudden curve
304 along the sides. The top (*k*) of this trunk is, like the bottom, flat, and fits within the sides, the back end rests on the top of the case (*f*) of the fan, and the forward end, which is wedge-formed, extends a little beyond the sides, and to the end thus projecting are attached bars (*ll*), which pass along on the outside of the sides (*ii*), and are connected again with the top at the back end, so that the sides, being thus embraced between the top and these bars, when the forward end of the top is depressed or elevated, the flexible or pliable sides follow, so that the
305 upper part of the mouth of the trunk will always present the same size. The top is held at any desired elevation by means of a cord (*m*) attached to any part of the frame, or it may be held in any other desired manner. By means of this, the height, size, and form of the mouth can readily be adapted to any size or form of former, or to the deposit of the fibres on any part thereof.

The back part of the trunk, between the bottom and the lowest of the rollers back of the brush, is open for the admission of a current of air towards the exhausted former, induced by the ex-
306 haustion and the rotation of the brush. This aperture is provided with a valve or shutter (*n*) by which it can be closed or opened at pleasure, to shut off in whole or in part the current of air. The axle of this valve is provided with an arm (*o*) and cord (*p*), by which the attendant can hold it in any desired position, and thus regulate the force with which the fibres will be carried to the former.

The fibres are fed to the brush from an apron (*q*) by means of two feed-rollers, (*r r*,) covered with cloth, and below these,
307 and in the curve of the brush, are two other similar rollers, (*s s*) also covered with cloth, against which the fibres are brushed by the rotation of the brush, the surface of these rollers forming a curved bed, against which the brush acts, whilst at the same time they continue to hold the fibres or the brush to act on them after they have been liberated by the feed-rollers. One of the feed-rollers receives motion by a belt in the usual manner, and

carries the others by means of toothed pinions (t, t, t, t) on the end of each, that mash into one another.

It is not deemed necessary to describe the manner of carrying the brush, the former, and the exhausting-fan, as there is nothing essentially new in these. It will be obvious, from the foregoing, that other substances may be substituted for copper in making the sides of the trunk, and that any substance which will bend with facility, and retain the form given to it, will answer the purpose, but from the experiments that have been made, copper has been found to answer the best purpose.

What we claim as our invention, and desire to secure by letters patent, is, first, making the sides of the trunk of thin sheet-metal, or other substance which will bend with facility, and retain the form given, in combination with the movable top, for the purpose of adapting the form of the mouth or delivery aperture of the trunk to any size or form of former, and to the regulation of the deposit of the fibres on the former, to determine the thickness of the bat, substantially as herein described.

Second. We claim so connecting the top of the trunk with the sides thereof that it can be elevated or depressed at pleasure, to increase or decrease the height of the mouth or delivery aperture of the trunk, and adapt it to any size of former that may be used, substantially as herein described.

Third. We claim the valve or shutter, in combination with the trunk, substantially as described, for the purpose of regulating or stopping the current of air through the trunk, as described.

And fourth. We claim the addition of the roller or rollers, covered with cloth, or other analogous substance producing like results, in combination with the feed-rollers and rotating brush, substantially as described.

A. B. TAYLOR,
H. A. BURR.

A. M. GUSTIN,
CHARLES M. KELLER,
Witnesses.

The United States Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of letters patent issued to Alva B. Taylor, on the 29th day of July, eighteen hundred and fifty-six.

In testimony whereof, I, S. T. Shugert, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this thirteenth day of August, in the year of our Lord one thousand eight hundred and fifty-six, and of the independence of the United States the eighty-first.

[L. S.] S. T. SHUGERT.

No. 15,443.

The United States of America, to all to whom these Letters Patent shall come:

Whereas Alva B. Taylor, of Newark, N. J., has alleged that he has invented a new and useful improvement in machinery for forming hat bodies, which he states has not been known or
314 used before his application, has made on oath that he is a citizen of the United States, that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to the best of his knowledge and belief, been previously known or used, has paid into the treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents signifying a desire of obtaining an exclusive property in the said improve-
315 ment, and praying that a patent may be granted for that purpose.

These are, therefore, to grant, according to law, to the said Alva B. Taylor, his heirs, administrators, or assigns, for the term of fourteen years from the twenty-ninth day of July, one thousand eight hundred and fifty-six, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Taylor, in the schedule hereunto annexed, and is made part of these presents.

316 In testimony whereof, I have caused these letters to be made patent, and the seal of the Patent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this twenty-ninth day of July, in the year of our Lord one thou-
[L. S.] sand eight hundred and fifty-six, and of the independence of the United States of America the eighty-first.

ROBERT McCLELLAND,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.

C. MASON,
317 *Commissioner of Patents.*

The Schedule referred to in these Letters Patent, and making part of the same.

To all whom it may concern:

Be it known, that I, Alva B. Taylor, of Newark, in the county of Essex, and State of New Jersey, have invented certain new and useful improvements in machines for manufacturing hat bodies, and that the following is a full, clear, and exact description of my said invention, reference being had to the accompanying
318 drawings, in which—

Figure 1 represents a side elevation of my improved hat body machine.

Figure 2 represents an end elevation of the same.

Figure 3 represents a longitudinal section of the same.

Figure 4 a horizontal section of the draft box hereinafter described.

Figure 5 is a plan of the scolloped-edged wheel and reciprocating bar hereinafter described; and

Figure 6 is a plan of that part of the picker frame sup-
319 porting the picking cylinders.

Various machines have been constructed for manufacturing hat bodies, which operate upon the general plan of first disseminating the fur or other stock in a flocculent state in the air, and afterward collecting it upon the surface of a perforated conical former, by means of the currents of air, induced by exhausting the air within the conical former. The conical bat thus collected upon the perforated former has generally been hardened by a subsequent process. In these machines the dissemination of the fur in
320 the air is effected by means of a picker or toothed cylinder, or cylindrical brush, which revolves at a high velocity, and to which the fur is presented by a suitable feeding apparatus, or feed motion.

In machines heretofore constructed upon this principle, the perforated cone has generally been set in a vertical position, or with its axis at right angles to the picking cylinder, in order that it might readily be removed from the machine to permit the
321 hat body to be hardened by a subsequent process. In one case the cone has indeed been set in a horizontal position, but a vibratory motion has been imparted to it, which unfits the machine for the automatic hardening of the bat, thus rendering it necessary to effect this operation by a subsequent process. Moreover, in this case, it has been found necessary to combine the picking cylinder and the cone with a vibrating trunk or directrice, which is inserted between the cone and the picker, and which increases the complexity of the machine.

In hat body machines, the speed at which the hat body is
322 formed is limited by the speed at which the fur can be fed to the picking cylinder, because if the fur is fed too rapidly, it is not properly picked. In order to increase the speed, one constructor has attempted to use two complete pickers of the usual construction, each accompanied with an appropriate feed motion. In this case the difficulty of feeding is much increased, and it is also necessary to use some means for combining the two distinct cur-
323 rents of fur produced by the two pickers, so as to deliver it upon the cone.

The object of my invention is to obviate the defects of pre-existing machines in a simple manner, so as to diminish the com-

plexity of the machinery, and at the same time increase its efficiency and facilitate its operation.

It consists first in a new combination of the feed motion, picking cylinder, and perforated cone, in which the latter is set directly in front of the picker, and with its axis nearly parallel or thereabouts thereto, but has no vibratory motion imparted to it, while
324 at the same time no trunk or directrice is interposed between the two. The machine is thus not only rendered more simple, but is well adapted to the automatic hardening of the bat by means of suitable machinery, without removing the cone from the machine, as the position of the cone is not varied while the fur is collecting upon it.

The object of the second portion of my invention is to enable me to form a hat body with greater speed, and at the same time to pick the stock more effectually without rendering the feed-
325 ing of the machine more troublesome, and it consists in combining with the ordinary picking cylinder a second picking cylinder, which runs in the opposite direction to the first one, and which removes the fur which would otherwise tend to adhere to the surface of the first, picks it thoroughly, and delivers it in such manner that the fur from the two picking cylinders forms one current, whose direction is controlled by the positions of the two cylinders. There are also other improvements in the arrangement and construction of the machinery devised by me, which will hereinafter more fully appear.

In the accompanying drawings, A, is the frame of the
326 picker upon which the picking cylinder and the feed motion are mounted, and to which the shafts are secured, by means of which motion is imparted to the various parts of the machine. The upper portion, *a*, of this picker frame, is made separate from the lower, and is attached to the latter by hinges or pivots, so that the end of the upper portion of the frame, at which the picking cylinder B is situated, can be raised or depressed to adjust the position of the picking cylinder to perforated cones of differ-
327 ent dimensions, and also to adjust the angle of incidences of the sheet of fur to any one cone. This adjustment of the upper portion of the picker frame is effected by turning a screw, *b*, which passes through a nut that is made fast to a cross-bar, *c*, of the lower portion of the picker frame, and bears against a cross-bar, c^1, that connects together the sides of the upper portion of the picker frame.

The upper portion of the frame is steadied and guided as it is raised or depressed by guide pins, which project downwards from the upper cross-bar c^1, through corresponding holes in the
328 lower cross-bar *c*. The feed motion consists of an endless band or apron, C, which runs upon two rollers, *d*, d^1, situ-

ated near the opposite extremities of the upper portion, *a*, of the picker frame.

One of these rollers, *d*, has a pulley wheel, D, secured to its axle to receive a belt, by which a rotary motion is imparted to the roller from the main shaft E, at the lower part of the frame. The feed-apron conveys the stock to a pair of feed-rollers, *e*, *e*, which are situated immediately in front of the picking cylinder B. Motion is imparted to the lower of these feed-rollers from the shaft
329 of the feed-apron roller, *d*, by means of a belt which encircles a belt pulley secured to the shaft, and a corresponding one upon the axle of the feed-roller. The upper roller is driven from the lower by means of a pair of pinions, whose teeth engage, and which are secured to the axles of the respective feed-rollers. In order that the feed-rollers may gripe the fur more securely, the upper one should be pressed towards the lower by springs or weights, and the barrels of the two rollers should be slightly fluted.

330 The feed-rollers immediately precede the picking cylinders B and B^1, whose barrels are longer than those of the feed-rollers, and are studded with teeth, which act upon the fur presented to them by rollers. This difference in the relative lengths of the barrels of the picking cylinders and feed-rollers is made up in the machine herein represented, by thickening the cheeks of the frame on their inner sides, at the points where the gudgeons of the feed-rollers are fitted to them.

331 The main picking cylinder, B, revolves in close proximity with the feed-rollers in the direction indicated by the arrow applied to it in the drawing, and it takes the fur directly from them. The secondary picking cylinder, B^1, is situated above the main one, and revolves in close proximity therewith, but in the opposite direction, as indicated by the arrow applied to it in the drawing. The journals of the secondary picker are supported in a pair of adjustable cheeks, S, S, which are pivoted concentrically with the axis of the main picker, B, so that the secondary
332 cylinder can be moved concentrically with the axis of the main cylinder, and that the direction of the common tangent of the two cylinders, which extends in a direction perpendicular to the line which joins their two axes, can be varied. The adjustable cheeks which support the journals of the secondary picker have circular slots in them, through which clamp screws, *v*, are passed, by which the cheeks are secured in their proper positions.

The picking cylinders should be driven at a high speed; in the machine represented in the accompanying drawings, motion
333 is imparted to them from the counter-shaft, E^1, by means of a belt which encircles a suitable pulley secured to the counter-shaft, and passes in reversed directions over corresponding pulleys secured to the shaft of the picking cylinders. The

counter-shaft, E^1, is driven from the main shaft by means of cog-wheels secured to the respective shafts. A guard, T, is inserted between the barrel of the picking cylinders and the upper feed-roller, to prevent the fur from being accidentally passed over the latter to the picking cylinders.

334 The perforated cone, G, which receives the fur from the picking cylinder, forms one of a series of three, G, G^1, G^{11}, which project radially from a pyramidal draft box, H. This draft box is supported by a fan case, I, which is sufficiently large to form a firm base for the draft box as well as to contain the fan by which the draft is maintained through the perforations of the cones. The draft box has a collar plate, *i*, at its bottom, which fits loosely upon a corresponding collar on the top of the fan case, I,

335 beneath the draft box, in such manner that the draft box with the cones upon it can be turned upon its axis to bring each cone in succession in the proper position to receive the flocculent fur from the picking cylinder. In order to hold the draft box with the cones upon it stationary until the proper quantity of fur is collected upon the cone opposite the picker, one of its corners is engaged with a spring catch, *g*, which is secured to the top of the fan case. The circular space within the collar plates is open so as to permit a free draft from the interior of the draft box to the fan case beneath. A circular opening is also made in each face

336 of the draft box behind the base of each perforated cone, so as to permit the draft to be drawn through the cone into the draft box.

Each perforated cone is made fast by a rim at its base to a ring plate, *f*, whose face is sufficiently broad to receive perforated cones of the various sizes used in the manufacture of hat bodies, and the ring plate is secured to a short shaft, *j*, that projects radially outward from the axis of the draft box. The inner journal of

337 each of these radiating shafts is supported in a hub, K, at the centre of the draft box, and the outer journal of each shaft is supported by a bridge tree, *m*, which crosses the opening in the face of the draft box. The radiating shafts are fitted with bevelled wheels, J, whose teeth engage with those of a corresponding bevelled wheel, J^1, that is secured to an upright shaft, K, passing through the hub of the draft box. This upright shaft extends upward sufficiently to pass through and project a short distance beyond the top of the draft box; it also extends downward into the fan case beneath, where it is fitted with a worm

338 wheel, *l*, to which motion is imparted by a worm, l^1, upon a horizontal shaft, E^2. The fan, M, by which the draft is maintained, is of the screw variety. It is situated at the mouth of circular opening in a partition, L, which crosses the fan case and divides it into two parts, the larger of which communicates by the opening in the collar plates with the draft box above, while

the smaller communicates with an air trunk situated be-
339 neath the floor of the factory, so that the air drawn from the perforated cones through the draft box and larger compartment of the fan case is discharged into the smaller compartment from which it escapes through the air trunk.

The fan shaft, E^3, is fitted with a belt pulley, and is driven from the counter-shaft, E^1, of the picker frame, by means of a belt, which also passes over a pulley upon the worm shaft, E^2, and drives the latter.

The axis of the draft box is inclined, in order that when the draft box is turned upon the collar plates, the perforated cones may readily pass beneath the picking cylinders; the draft box is
340 also set close to the picker frame, so that the perforate cone upon which the fur from the picker is received, is separated by no greater space from the latter than is necessary to permit the perforated cones to pass the picker frame when the draft box is turned. The inclination of the axis of the draft box requires a corresponding inclination in the upright shaft, K, which is sufficient to permit the teeth of the worm wheel to work freely in the worm without requiring to be skewed.

As has been stated, there are three perforated cones, G,
341 G^1, $G^{1\,1}$, upon the draft box; one of these, G, figures 1 and 2, is in the proper position to receive the fur delivered by the picking cylinder, being opposite thereto, and extending lengthwise therewith, that portion of the conical surface which is nearest to the picking cylinder being slightly oblique thereto, as shown in the accompanying drawings. This position of the cone with reference to the picker is attained by setting the radiating shaft, *j*, at a suitable inclination to the upright shaft, K, and the draft box is made of pyramidal form, in order to accommodate its sides
342 to the position of the base of the cone. Of the other two cones, one, G^1, is in a proper position for the hardening of the coating of fur or bat, which has collected upon it. This hardening is effected by the combined action of pressure and motion. The pressure is imparted in this instance by means of a conical cone, G^2, which lies loosely upon the bat, upon which cover a series of weighted rollers, N, rest. A rapid reciprocating movement is imparted to the cover by means of a bar, O, which slides radially to and fro across the top of the draft box. The outer ex-
343 tremity of this reciprocating bar is fitted with an arm, *n*, that projects downward, and is received in a ring groove which is formed in a boss, *o*, secured to the head of the cover. The inner half of the reciprocating bar has two pins, *r*, *r*, projecting from its upper face, which are acted upon alternately by the scolloped rim of a wheel, P, that is secured to the upper end of the upright shaft, K. The reciprocating bar is prevented from

turning with the scolloped wheel, P, by a guide standard, *q*, in which the outer end of the reciprocating bar slides, while
344 its inner extremity is maintained in its proper position by the upright shaft, K, which passes through a slot in the bar; hence, as the upright shaft and the scolloped wheel upon it revolve, a short and rapid, or tremulous reciprocating movement is imparted to the reciprocating bar, O, and from it by means of the arm, *n*, at its outer end to the cover, G^3, that is borne upon the bat by the weight of the rollers, N.

In order that the hardened bat may be readily removed from the perforated cone, a blast of air is forced through the cone
345 into the interior of the bat. This blast of air is obtained from the fan in the fan case beneath, in the following manner. The interior of the draft box is divided by three radial partitions, S, S, S, which extend inward to the central hub K, into three divisions, one of which corresponds with each perforated cone. That portion of each radial partition which is above the circular opening in the collar plates, *i*, and below the central hub, K, is cut away so as to leave the cylindrical space above the circular opening in the collar plates unobstructed. A curved partition, *t*, projects upwards into this cylindrical space from the
346 fan case beneath. This curved partition is secured by its lower edge to the collar plate upon the fan case, and it is of such height and breadth that it closes the space between two of the radial partitions, *s*, *s*, and shuts off one division of the draft box and the perforated cone communicating therewith from the remaining two, so that the draft passing to the fan case cannot be drawn through the perforated cone, whose base is adjacent to the curved partition. That portion of the top of the fan case
347 which is immediately beneath the division of the draft box, from which the draft is shut off, is cut away, so as to form a communication between the division of the draft box and the smaller compartment of the fan case, into which the fan discharges air; hence a portion of the air forced by the fan into the smaller compartment of the fan case, and tending to escape therefrom, finds its way upwards into the cone, and passing through the perforations thereof, presses upon the interior of the hat body, and assists its disengagement from the cone.

348 The various parts of the machinery thus described are caused to move by imparting a rotary motion to the main shaft, E, from the prime mover of the manufactory. When the machine is in operation, the feed-apron, feed-rolls, picking cylinders, and perforated cones, move in the directions respectively indicated by the arrows in the drawings. A weighed quantity of fur or other suitable stock sufficient to form one hat body, is laid by the attendant upon the feed-apron, and is conveyed by it to the feed-rollers, which present it to the main picking cylinder. The

latter, in its rapid revolution, picks the fur and carries it
349 round with it until the fur is deflected by meeting the current produced by the upper picking cylinder, as the fur naturally tends to adhere to the teeth of the main picking cylinder, especially when fed rapidly; a portion of it would be carried entirely round with the main picking cylinder, as it would be in all pickers with which I am acquainted for any purpose, unless some means were employed to prevent this effect; but in my machine, the secondary picking machine revolving above the main one, takes from the latter the fibres which are carried between the two,
350 and carries them round until they meet the current produced by the main picking cylinder; the two currents then unite and pass from the two cylinders in the direction of a perpendicular to the common tangent to the two, or in a line perpendicular to that which unites the axes of the two cylinders, as indicated by the red lines in figure 3.

When the fur leaves the picking apparatus, it is drawn toward the perforated cone immediately opposite thereto. As this
351 cone slowly revolves, the flocculent fur collects upon it until the charge upon the feed-apron is exhausted. At this part of the operation the attendant stops the feed-apron upon which he has meanwhile been distributing a second charge, which is separated by a short vacant space from the first one. As soon as the whole of the fur is collected upon the perforated cone an attendant applies a cover to the bat, and then turns the draft box one-third round; this movement brings a second cone in the proper position to receive fur from the picker, while the first one, with the
352 bat and exterior cone upon it, is brought to the hardening apparatus, where the pressure applied by the cover, combined with the tremulous movement imparted to it, induces a rapid felting of the fibres of fur, and the consequent hardening of the bat. This operation proceeds so quickly that by the time the second cone has received a charge of fur upon it from the picking cylinder, the bat upon the first one is sufficiently hardened to bear handling without injury. The draft box is now turned a second third of a revolution, by which movement the third cone is presented to the picking cylinder, the second one passes to the
353 hardening apparatus, and the first, with its hardened bat, is freed from the hardening apparatus, and is in the proper position for the removal of the bat. This last operation is effected by the shaking of the cover by hand, when the pressure of the air within the cone detaches the hardened bat, so that it may be readily withdrawn with the cover, leaving the perforated cone free and ready to be again presented to the picking cylinder. After the hardened bat or hat body is removed from the machine, the hardening process may be carried to a greater extent by wrap-
354 ping the bat in a damp linen cloth and working it by hand

in the same manner that bats are worked in the manufacture of hat bodies by hand. The dimensions of the cover G^3, with respect to the bat, are not important, provided that it be large enough to pass easily over it, as the object of the cover is not to confine the fur, but to impart pressure and motion to it. If the cover be of nearly the same size as the bat, it should be perforated to permit the air to press upon the bat; but if the cover be
355 five or six inches larger in diameter than the bat, it is not necessary that it should be perforated, as there will then be sufficient space for air to pass inside of the cover.

From the foregoing description it will be perceived that the perforated cone is directly opposite the picking cylinder; hence the fur which proceeds from any one portion of the picking cylinder, lodges upon a corresponding opposite portion of the perforated cone, and if it be necessary to increase the thickness of the bat at any particular part of the perforated cone, the operation is effected by distributing the charge of fur upon the feed-apron in such manner that
356 there shall be more fur conveyed to that part of the picking cylinder which delivers fur to the part of the perforated cone where the bat is to be made thickest, and, on the other hand, less fur is fed to that part of the picking cylinder which delivers fur to the part of the perforated cone where the bat is to be made thin, and which is usually the head or tip.

The location and arrangement of the cone for receiving the coating, in my machine, with reference to the picking apparatus,
357 and feed-motion, is one of the characteristics which distinguish my invention from those which have preceded me.

I am aware that conical formers for hat bodies, like those of the well-known machinery for making wool hat bodies, have been set with their axes in a horizontal position, or thereabouts, when the stock of which the hat body is formed is delivered from cylinders also horizontal; but in such cases, in order that a proper thickness of stock should be collected upon different portions of the conical former, it has been found necessary not only to turn the
358 latter upon its axis, but also to impart to it an oscillating or vibratory movement, so as to change its position while the coating is being collected upon it. Such a combination of a moving conical former with apparatus to deliver stock, is clearly distinguished from my invention, which consists in locating the perforated cone to receive the fur opposite the picker, and arranging it with its axis lengthwise therewith, in such manner that all oscillating or vibratory movement is dispensed with, and that the position of the perforated cone, with respect to the pick-
359 er, is not changed while the fur or other stock is being collected upon it.

The two picking cylinders working in connection upon the same stock, pick it effectually as the large flocks of stock whose fibres

are not separated by the teeth of the main picking cylinder are acted upon by the teeth of the secondary picking cylinder. As the stock is thus subjected to a duplex picking process, its fibres are more thoroughly disseminated than is practicable when a single picking cylinder is employed; the stock may also be fed at a faster rate,
360 and consequently a larger amount of work may be effected in a given time without requiring any additional care or trouble in the feeding of the stock, as but one feed-apron is employed. The employment of the duplex picking apparatus is also attended with another advantage. As has been before said, the fur passes from it in a direction which is perpendicular to the line which joins the axes of the two picking cylinders; hence, by moving the secondary cylinder, it is possible to adjust the direction of the current of fibres as may be necessary to insure proper deposits upon perforated cones
361 of different sizes. This adjustment is readily effected by slacking the clamp screws which make fast the adjustable cheeks that support the journals of the secondary cylinder, adjusting the cheeks to the new positions found by trial to be the best, and securing them again by tightening the clamp screws.

It will be evident to the skilful mechanic that various changes may be made in the machinery described by me, without materially affecting the principle of my invention, and I re-
362 serve to myself the right to make such changes as circumstances may require.

What I claim as my invention, and desire to secure by letters-patent, is:

The combination of a perforated cone, picking apparatus, and feeding apparatus, located and arranged as described.

The combination with a main picking cylinder of a secondary picking cylinder, operating substantially as set forth.

The pyramidal draft box constructed substantially as herein set forth in combination with a fan and fan case for generating the currents of air.

363 In testimony whereof I have hereunto subscribed my name.

ALVA B. TAYLOR.

GEORGE W. TAYLOR,
E. CHAPIN,
Witnesses.

NEW YORK, *May* 25, 1857.

TO HENRY A. BURR, ALBERT H. WRIGHT, and JAMES M. RIBLET.

364 GENTLEMEN: You will please take notice of provision in the agreement between Charles St. John, Henry A. Burr, and Alva B. Taylor, parties of the first part, and me, George E. Cowperthwaite, party of the second part, bearing date the seventh day of January, 1853, licensing me or my assigns to run and use

hat-forming machines, under letters patent of Henry A. Wells, and Alva B. Taylor, and Henry A. Burr, in the States of Missouri and Illinois, for five years from the date of said agreement, and with the right and privilege to me, said party of the second
365 part, and my assigns, to have the term of said license extended, and for the parties of the first part to said agreement, their representatives and assigns, to renew and extend the duration thereof, as provided in said agreement, by their having notice in writing six months previous to the expiration of said five years.

And you will further take notice, that you are hereby notified, pursuant to the provision of the aforesaid agreement, that I have elected, and do hereby require to have the term of said license extended for such further period as remains unexpired, of the
366 privilege of said patents, or either of them, and that you are hereby required to so extend said license in writing, and to deliver such extension to me.

And you will further take notice, that such extension is to be as broad as, and to extend to the full extent to which power was given to me or my assigns in said agreement, to have the same extended by the notice therein mentioned.

Yours respectfully,

G. E. COWPERTHWAITE.

367 Received June 16th, 1857.

H. A. BURR,
A. H. DUCKWITZ.

The United States Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the files of this office of a caveat filed by H. A. Wells, on the ninth
368 day of October, eighteen hundred and forty-four. In testimony whereof, I, S. T. Shugert, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this third day of September, in the year of our Lord one thousand eight hundred and fifty-seven, and of the independence of the United States the eighty-second.

[L. S.] S. T. SHUGERT.

369 To the COMMISSIONER OF PATENTS:

The petition of Henry A. Wells, of the city and State of New York, respectfully represents:

That he has made certain improvements in the mode of manufacturing hats, and that he is now engaged in making experiments for the purpose of perfecting the same preparatory to his applying for letters-patent therefor. He therefore prays that the subjoined description of his invention may be filed as a caveat in the confi-

dential archives of the Patent Office, agreeably to the provisions of the act of Congress in that case made and provided, he
370 having paid twenty dollars into the treasury of the United States, and otherwise complied with the requirements of the law.

H. A. WELLS.

New York, October 5th, 1844.

371 *Specification by Henry A. Wells of his improvement in the manufacture of hats.*

The manufacture of hat bodies out of wool, or other material, as the foundation of fur nap, has been variously done by hand and by machinery.

But as yet no machine has been devised to make the hat body and the fur nap together by one operation at the same time; and it is to effect this object that this applicant has devised this improvement hereinafter described, and this applicant, in compli-
372 ance with the requirement of the law, describes, in the first place, the construction and operation of the machinery which comprises his improvement.

The material of fur being cleansed and opened, so that it may be spread equally upon an endless cloth, is ready for operation.

Upon a frame, represented in elevation by figure 1, and in plan view by figure 2, there is an endless cloth running over rollers upon and by which the fur material may be conveyed to a brush revolving with great rapidity against the point of delivery, which
373 point of delivery is formed by a covered roller acting closely upon the roller carrying the endless cloth at the delivery end thereof, which roller, with another, may or not carry an endless cloth. The brush revolving, say three thousand times in a minute, throws the fur into a conduit, whose sides and bottom, diverging from said point of delivery to the width and height of a cone frame of about two and a half feet, more or less, in height, and sixteen inches diameter at its base, conveys the buoyant fur by suction towards and upon the cone frame, which is constructed with a spherical apex, the cone frame being made
374 of zinc sheets, perforated closely with small holes, and standing upon a box from which the air is exhausted by the action of a fan revolving within a box or case, connected by a conduit therewith. The cone standing upon a revolving base, carried by convenient mechanism, so that as the cone revolves the buoyant fur applies itself by force of suction through the holes in the conical frame to each and every part of it; and to further this purpose, a movable bonnet is applied to the upper part of the diverg-
375 ing conduit of the flying fur, so that this may be directed to the upper part of the cone, or its spherical portion, until fur or substance sufficient be deposited thereon, and a full supply,

which artists skilled in the manufacture of hat bodies will readily judge of, has been conducted to the conical part, the lower part of the diverging conduit being a broad inclined plane, so as to throw the requisite greater quantity to form the brim of the hat body, and the supply of fur continued during fourteen to fifteen revolutions of the cone frame, the operation of forming the hat
376 body and fixing the fur for the nap at the same time at one operation will be accomplished. Then the cone frame, with its hat body thus formed, being closely covered with woollen cloths taken from boiling water, and by a zinc conical case over all with large perforations, and secured thereon by vertical hinges on one side and a vertical rod through rings on the other. The whole, that is, the cone frame with the hat body thereon, covered with hot cloths, and enveloped in the zinc case, are immersed in a vessel of boiling hot water for two minutes, being turned over or not
377 in mean time, and then being placed in the open air, the case and cloths taken off, the cone is inverted, and the hat body dropped off from the frame so inverted, and is then in effect ready to be planked and for all further operations by hand or machinery, till it be of requisite thickness or size for shaping, dyeing, or finishing.

The exterior surface being capable of raising a nap of any requisite and convenient length, which is the main object of this improvement.

378 The advantage of this fabric and this mode of manufacturing it are quite plain to the understanding of men experienced in the art of manufacturing hats.

There are other materials commonly used in making the nap of hats, which by being mixed with materials proper only for hat bodies, may be formed by this means into hat bodies ready to be napped, or have the nap raised out of it as aforesaid, and
379 this applicant extends his claim to cover the manufacture by the machinery aforesaid of all such materials commingled together into hat bodies ready to be napped as aforesaid. In said machinery there are two cone frames on one cone box, and this box is made to revolve horizontally upon its centre, so as to *prevent* each cone frame in succession to the conduit of the fur, by which time may be saved in the operation.

There is a primary feeder to break the fur when matted together.

H. A. WELLS.

GEORGE SULLIVAN,
380 MORTON FAIRCHILD,
Witnesses.

STATE OF NEW YORK,
City and County of New York.

On this seventh day of October, A. D. 1844, before the sub-

scriber, a commissioner of deeds, duly authorized to administer oaths, personally appeared the within named Henry A. Wells, and made solemn oath that he verily believes himself to be the original and first inventor of the mode herein described for manufacturing hats, and that he does not know nor believe that the same was ever before known or used, and that he is a citizen of the United States.

381 B. A. CAMPBELL,
Com. of Deeds and to take Affidavits, &c.

H. A. WELLS.

References to the drawing annexed, referred to in the specification of Henry A. Wells, of New York, which references apply to all the figures, so far as they are expressed thereon respectively.

a, Frame.
382 *r*, Rollers carrying an endless feeding-cloth.
f, Feeding-cloth.
b, brush revolving against the point of delivery.
c r, covered roller resting upon the lower roller, *r*.
B F, conduit of the buoyant fur or other material.
S, sides of top of this conduit.
B, bottom of this conduit.
D, bonnet of this conduit.
C F, cone frame, perforated.
c f b, cone frame base resting on a wheel.
383 C S, cone shaft.
S W, spun or driving-wheel to drive the cone base-wheel.
C B W, cone base-wheel.
C B, cone box.
C A, conduit of air from cone box to fan box.
F B, fan box and fan, F.
S *p* C, side passages from conduit of air to fan box.
O A, outlet of air.
P F, pulley to fan.
P C S, pulley to cone shafts.
384 P B, pulley to revolving brush.
P E C, pulley to endless cloth roller.
C E C, cover to endless cloth, perforated.

The United States Patent Office, to all persons to whom these presents shall come, greeting:

385 This is to certify, that the annexed are true copies from the files and records of this office, of all papers found on file and record, with the exception of the two patents, as reissued, in the application of Charles St. John, Henry A. Burr, A. H. Wright, and James M. Riblet, for a reissue of letters patent, issued to Henry A. Wells, on the twenty-fifth day of April,

eighteen hundred and forty-six, which application, at the request of the Commissioner of Patents, was divided, and two reissues granted on the thirtieth day of September, eighteen hundred and fifty-six, and on the seventh day of October, eighteen hun-
386 dred and fifty-six, respectively—the copies of the specifications, showing the erasures, interlineations, and marginal writing, as they appear in the originals.

In testimony whereof, I, Joseph Holt, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this nineteenth day of October, in the year of our Lord one thousand eight hundred and fifty-seven, and of the independ-
387 ence of the United States the eighty-second.

J. HOLT.

Reissue—No. 396. Baldwin.

Charles St. John, H. A. Burr, A. H. Wright, and James M. Riblet, assignees of Henry A. Wells, deceased. Of New York, county of New York, State of New York.

Hat Bodies.

388 Received, September 4th, 1856.
Petition, " " "
Affidavit, " " "
Specification, " " "
2 drawings, " " "
Model old Pat., " " "
1 cert. dep., $15, Sept. 4th, 1856.
Cash.
Examined, Baldwin, Sept. 18th, 1856.
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389 Patented April 25th, 1846.
Reissued Sept. 30th, 1856.
Recorded vol. 4, page 220.
H.

A. P. BROWNE,
New York.

To the Commissioner of Patents:

The petition of Charles St. John, Henry A. Burr, Albert H. Wright, and James M. Riblet, all of the city, county, and State of New York, respectfully represents:

390 That letters patent of the United States, bearing date the 25th day of April, 1846, were granted to Henry A. Wells, a citizen of the United States, and then residing in the city, county, and State of New York, for improvements in the process of, and machinery for, making hat bodies of fur, which said letters patent, and all the right, title, and interest in and to the

same, have passed by assignment, and are now vested in
391 your petitioners.

That the said Henry A. Wells is now deceased, and after the transfer and assignment of the said letters patent to your petitioners, and after the decease of the said Henry A. Wells, your petitioners were advised by counsel learned in the law, that the said letters patent are inoperative to secure the said invention described in the said letters patent, by reason of a defective and insufficient specification, which information your petitioners verily believe to be true, which said defects have arisen from inad-
392 vertence and mistake, and without any deceptive or fraudulent intention. Your petitioners, therefore, pray that they may be allowed to surrender the said letters patent, and they hereby do surrender the same, and pray that new letters patent may issue to them, as the assignees of the whole right, title, and interest, for the same invention, for the residue of the period for which the original letters patent was granted, in accordance with the amended specification herewith presented and herewith attached, and by them signed, they having paid fifteen dollars into the treasury of the United States, agreeably to the requirements
393 of the act of Congress in that case made and provided.

And your petitioners hereby authorize Alexander P. Browne, (in connection with Charles M. Keller as counsel,) to act as their true and lawful attorney in presenting this application, altering, amending, or withdrawing the same, as the case may require, and to receive the patent when granted.

CHARLES ST. JOHN.
H. A. BURR,
A. H. WRIGHT,
394 JAMES M. RIBLET.

STATE OF NEW YORK,
City and County of New York.

On this second day of September, A. D. 1856, before me, personally came Charles St. John, H. A. Burr, A. H. Wright, and James M. Riblet, and being severally duly sworn, each for himself, did depose and make oath that the foregoing petition, by him subscribed, contains the truth, the whole truth, and nothing but the truth.

395 LOUIS N. GLOVER,
Com. of Deeds.

Application for Reissue No. 396.

To all whom it may concern:

Be it known, that Henry A. Wells, late of the city, county, and State of New York, now deceased, did, in his lifetime, invent cer-

tain new and useful improvements in the process of and machinery for making hat bodies of fur, for which said improvements letters patent of the United States were granted to the said Wells,
396 bearing date the 25th day of April, 1846, of which the following is a full, clear, and exact description of the principle or character which distinguishes the said invention from all other things before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this description, in which figure 1 is a plan of the machine; figure 2, a longitudinal, vertical section; and figure 3, a longitudinal elevation. The other figures will be described in their appropriate places. The same
397 letters indicate like parts in all the figures.*

[It has long since been suggested and described that hat bodies might be made of fur by knocking the fibres from the doffer of a carding machine by a rotating beater, to suspend them in the atmosphere over a perforated cone, or other form, and drawing such fibres on to the surface of such cone or other form, by exhausting the air from the inside, thereby inducing currents of the surrounding air in which the fibres are suspended, to travel towards and through the perforations, and thereby deposit and hold such fibres of fur on the outer surface of such perforated
398 cone, or other form, with the view to form a bat to be afterwards felted into a hat body. But such suggested or described plan never did, and never can, answer a practical purpose for making hat bodies, for several reasons. Fur cannot be successfully worked in what is known as a carding machine, on account of being too light to be properly acted upon by the carding operation.†]

399 Hat bodies are required to be made thick at and near the rim, and thin along the crown and tip, that the required strength may be given where it is required, without making the hat too heavy, and at too great a cost of material. This disposition of the fur can be obtained by the skill and judgment of the workman by the hand process, known under the name of "bowing," but cannot by the plan above referred to, for the reason that the fibres are only controlled by the currents induced through the apertures of the cone, or other form, by the exhaust, instead of being thrown and properly directed for distribution, on to
400 the cone, or other form. When the fibres are not properly thrown and directed, but are drawn to the surface by the action of the exhaust, the force thus induced gradually decreases as the apertures in the cone are closed up by the accumulation of the fur deposited on the outer surface thereof, and in consequence

* Insert A. See amendment, filed Sept. 16, 1856. Page 112.
† Erased. See amendment, filed Sept. 16, 1856. See p. 111.

the impelling force, which carries the fibres, becomes insufficient to control the force of gravity which will then prevail, and cause the fibres to accumulate to a greater thickness on the tip of the
401 cone, where much less is required than below. And the said suggested plan cannot produce a practical result for the further reason, that there is no mode described by which the bat of fur fibres can be hardened while on the cone, that it may be removed from such cone preparatory to the after and well-known process of sizing or felting.

The invention of the said Henry A. Wells, by which the required and much desired practical result was obtained, consists in forming the bat of fur fibres by throwing the fur in properly regulated quantities against a section of the circumference of a per-
402 forated cone, or other form, as the same is rotated to present in succession every part of the circumference thereof to the current of impelled fur, and thereby obtain the required thickness of bat, when this is combined with the holding of the fibres on to the cone, during the operation, by the pressure of the surrounding atmosphere, induced by exhausting the air from within the said perforated cone, or other form.

403 [And the said invention of the said Henry A. Wells also consists in combining with the said method of forming the bat of fibres on a perforated cone, or other form, the hardening of such bat while on the cone or other form to give it the required consistency to admit of taking it off in a suitable condition for sizing by the well known process of felting.*]

In the accompanying drawings *a* is a frame properly adapted to the operative parts of the machine, and (*b*) the lower feed-apron, on which the stock is spread, by the attendants, in separate
404 parcels, each sufficient for the formation of a hat, according to its intended weight. This apron, or endless belt of cloth, or other suitable material, passes around a roller *c* and a lip *d*; the former at the back of the machine, with its bearings in sliding-boxes governed by set screws *ee* for the purpose of tightening the apron; and the latter near to the rotating brush *f*, and so formed as to present a slightly rounded edge for the apron to pass over where it presents the fur to the action of the brush. Instead of this slightly rounded edge, a small metallic roller may be substituted; but when this is done, the roller
405 should be supported at different points between its end journals, and this when effected by letting it run in a circular groove in the lip, as represented in section at figure 4, where *g* indicates this roller. The fur, as it is carried along towards the lip *d*, is gradually compressed by the upper apron b^1, which passes around a feed-roller c^1 and lip d^1, in manner similar to the

*Erased. See amendment, Sept. 16, 1856. See p. 111.

under feed-apron. The roller c^1 runs in a frame i (of which the lip d^1 forms part) hung on journals that rest in standards j,
406 so that the lip d^1 can be made to pass on to the fur between it and the under lip d, and thus gripe the fibres and present them to the effective action of the brush f. The under plane of the upper apron b^1 is inclined to the upper plane of the lower one b, the more effectually to present the fibres in the proper manner to the brush.

The roller c^1 of the upper apron runs in sliding-boxes,
407 governed by set screws $e^1 e^1$, and is placed forward of the journals of the frame, so that the tension of the belt i^2, which communicates motion from the lower roller c to the upper one c^1, may press the upper lip d^1 on the under lip d; but this may be effected by means of springs, weights, or other well-known mechanical devices for making pressure under similar circumstances.

The fibres, as they pass from the feed-aprons, are acted upon by a brush f that rotates with great velocity, and which is composed of parallel rows of stiff bristles projecting from a cylinder,
408 but which may be differently constructed and composed, if desired. As the fibres are first presented, they are brushed and properly laid, by the downward action of the brush, as indicated by the arrow, and when liberated are carried down the curved surface l of a chamber or tunnel m; and at the lower edge of this they meet a current of air (that enters a narrow aperture n, near the bottom of the chamber, and extending the whole length of the brush) which being induced by the rotation of the brush
409 and the partial vacuum in a perforated cone, prevents the fibres of fur from falling and resting on the bottom of the chamber, and carries them on to the perforated cone o. This chamber extends over and under the brush and the forward part of the lips, and turns on the journals of the brush, or is otherwise so arranged as to have a slight motion, the axis of which is the same as that of the brush. Its bottom rests on a set screw p, to regulate the delivery-end of the chamber relatively to the cone. Its forward end, in addition to this, is provided with a hinged flap q, regulated by a cam lever, as a means of reg-
410 ulating the delivery of the fibres. Its top r is gradually elevated, and sides contracted, to make the delivery aperture nearly of the form of the cone, but narrower and higher. And its upper part is provided with a hood s, so curved as to correspond generally with the curve of the tip of the cone. This hood is hinged to the upper part of the delivery aperture of the chamber, and is connected with an eccentric t by means of a cord u and bell crank u^1, that passes over a pulley r^{11}, so that
411 each revolution of this eccentric carries the hood up and down to direct the discharge and distribute the fibres on to the cone—a greater thickness being desirable in the parts of the bat

which form the brim, than on the tip and crown; and when it is desired still further to diversify the distribution of the fibres, a cam can be substituted for the eccentric, and the connection between it and the hood is formed as represented in section at figure 5, where the cam t acts on a lever t^1, connected with the hood s by the cord u.

412 The cone o is made in the usual manner, but of thin sheet-metal, perforated, instead of wire gauze. Its lower edge fits in a metallic ring w, that runs in an appropriate collar in the upper part of a case x, and its outer periphery is provided with cogs that mash into the cogs of a pinion y (concealed in the drawing by the pulley d^2) on a vertical shaft z, by which a slow rotary motion is given to the cone, as the fibres are thrown on to it, to distribute them equally all around the cone. The case x is sufficiently long to receive two rings w, one on each side of the pinion

413 y, by which both are kept in motion, and it (the case) is made to swivel on a hollow collar f^2, to which its bottom is fitted, so that when one cone is covered it may be turned aside by turning the case half a revolution, and another cone put on to the other ring, that another bat may be in the process of forming, whilst the one already formed may be prepared for the hardening process in the manner to be hereafter described.

The case x communicates through the hollow collar f^1 with an exhausting fan-blower g^1, which consists of a vertical arbor h^1 with oblique vanes, i^1, so that when rotating with great velocity,

414 in the direction of the arrow, the air is exhausted from the case x and the perforated cone o. When one of the cones is removed from one of the rings w to be taken to the hardening apparatus, the aperture in the ring w must be closed up with a cap plate w^2 to prevent the access of air. Any other mode of exhausting the case and cone may be employed, but this is the most efficient which he (Wells) essayed.

The preparation of the formed bat for hardening is effected by covering it with pieces of felt or fulled cloth just taken from

415 hot water, and this is done in the following manner, namely: The attendant takes from a kettle of hot water a piece of felt cloth rolled up on a roller, and applies one end of it to the surface of the bat, and as the cone rotates the felt cloth winds from the roller on to the bat on the cone; another piece of felt cloth is put on the top, and then a strong perforated metallic cone k^1 (see figure 6) is put over the whole, the more effectually to hold the fibres of the bat, and to make a slight pressure on them whilst it is immersed in hot water to harden. As the perforated cone

416 o is better when made very thin, the pressure of the water, when drawing it out of the kettle, after the bat has been hardened, tends to and would collapse it, and therefore to prevent this another perforated metallic cone l^1 (see figure 7) is put inside

(before the whole is immersed in hot water,) to sustain the pressure in drawing the whole out of the hardening kettle. The relative situation of the three cones, the bat, and the covering felt cloth, preparatory to the hardening process, is represented on an enlarged scale at figure 8, which is a vertical section through the whole. The inner sustaining cone may be dispensed with,
417 if desired, by making the cone *o* of greater thickness and strength.

All the operative parts may be set in motion by any of the known means, such as belts, as fully represented in the accompanying drawings, in which m^1 is a main line shaft, overhead, driven by any first mover. From a wheel, n^1 on it at band o^1 extends to a pulley p^1 on the shaft of the brush, which should make about two thousand revolutions per minute, more or less. From an-
418 other wheel q^1 on this same shaft, a band r^1 extends to a pully s^1, on the shaft of which there is a wheel t^1, that drives the exhaust-fan g^1 by the belt $u^{1\,1}$. And from a pulley v^1, on the same line shaft, a belt extends to a wheel w^1, on the shaft of which there is a pulley x^1, from which extends another belt y^1 to a wheel z^1 on the shaft a^2, (that carries the eccentric t) to give all the reduced motions required for the other parts of the machinery.

From a wheel b^2 on this shaft, a belt c^2 extends to a pulley
419 d^2 on the shaft z that rotates the cone o. And another pulley e^2 drives the wheel f^2 of the feed-roller c by the belt g^2, and on the other end of the axle of this feed-roller there is a pulley h^2 which drives, by a cross-belt i^2, the upper feed-roller c^1. If desired an alarm can be connected with the feed-roller of the lower apron, to announce to the attendant when each charge of stock is exhausted, that the cones may be shifted. This can be done by connecting the arbor of the feed-roller c, of the lower feed-apron, by a belt with a wheel k^2, provided with a cam or pin, to lift at every revolution the hammer l^2 of a bell m^2, the
420 striking of which shall give requisite indication.

It will be obvious from the foregoing, that the hood may be operated by hand instead of machinery, thus substituting the attention, skill, and cost of an operative, for the positive regularity and cheapness of mechanical movements. It may be well to add, as a mere matter of precaution, that this invention is not limited to the making of hat bodies, but to the making of bats on formers of any other shape or configuration, the form of the delivery aperture of the chamber, and the hood, and the movements
421 of the latter being properly adapted to the change of form of the perforated mould or former, with the restrictions indicated.

Having thus described the mode of application of the said invention of the said Henry A. Wells, as the same was successfully reduced to practice by him, we do not wish to be understood as limit-

ing the claim of invention to such mode of application, as other modes may be devised, operating on the same principle, or having the same mode of operation, and only differing therefrom in the substitution of equivalent means.

422 What is claimed herein as the invention of the said Henry A. Wells, deceased, is forming bats of fur fibres by throwing the fur, in properly regulated quantities, substantially as herein described, against a section of the circumference of a perforated cone, or other form, as the same is rotated to present in succession every part of the circumference thereof to the current of impelled fur, to obtain the required thickness of bat, substantially as described, in combination with the method of holding the
423 fibres on to the cone, or other form, during the operation, substantially as described, and for the purpose specified.

[And what is further claimed as the invention of the said Henry A. Wells, deceased, is combining with the said method of forming the bat, substantially as specified, on a perforated cone, or other form, the hardening of such bat while on the perforated cone, or other form, to give it the required consistency to admit of taking it off in a suitable condition for sizing by the well known or other process of felting.*]

CHARLES ST. JOHN,
H. A. BURR,
424 A. H. WRIGHT,
JAMES M. RIBLET.

WM. H. BISHOP,
CHARLES A. WILSON,
Witnesses.

STATE OF NEW YORK,
City and County of New York, ss.

On this second day of September, A. D. 1856, before me personally came Charles St. John, H. A. Burr, A. H. Wright, and James M. Riblet, and being severally duly sworn, each for himself, did depose and say that the contents of the foregoing
425 specification by him subscribed are true

LEWIS N. GLOVER,
Com. of Deeds.

Hon. COM. OF PATENTS:

SIR: I enclose herewith the specification, duplicate drawings, and certificate for the fee of fifteen dollars, in the matter of the application of Charles St. John and others, for the reissue of letters-patent granted on the 25th of April, 1846, to H. A. Wells, late of New
426 York city, (now deceased,) for improvements in the process of, and machinery for, making hat bodies of fur.

*Erased. See amendment, filed September 16, 1856. See p. 111.

The old patent is also enclosed herewith, together with an affidavit of H. A. Burr, (one of the petitioners for the reissue,) of the loss of the drawings which we attached to the patent.

I remain, sir,

Yours respectfully,

427 ALEX. P. BROWNE,
By WM. H. BISHOP.

New York, Sept. 3d, 1856.

Received and filed Sept. 4, 1856.—L. F. W.

Specification for the reissue of patent granted to H. A. Wells, (now deceased,) on 25th of April, 1846, for making hat bodies.

In the matter of the petition of Charles St. John, Henry
428 A. Burr, Albert H. Wright, and James M. Riblet, for the reissue of the letters-patent granted on the 25th day of April, 1846, to Henry A. Wells, (now deceased,) for improvements in the process of, and machinery for, making hat bodies of fur.

I, Henry A. Burr, of the city, county, and State of New York, being duly sworn, do depose and say, that I am, jointly with the persons above named, the sole owners of the said letters-patent; that
429 the said letters-patent have been for some years in my possession; that at a term of the circuit court of the United States for the district of New Jersey, held at Trenton, in said State, some years ago, the drawings attached to the said letters-patent were detached therefrom by the judge of said court, and have been lost, mislaid, or missing since the time last referred to; that I have caused diligent search to be made for said drawings, and that the same cannot be found. And further this deponent saith not.

H. A. BURR.

Sworn before me this 2d day of Sept., 1856.

430 JOHN F. GRAY,
Com. of Deeds.

U. S. PATENT OFFICE, *Sept.* 9, 1856.

GENT: In your application for a reissue of the patent granted to Henry A. Wells on the 25th August, 1846, the specification is herewith returned for a division. The machinery for forming and the method of hardening present substantive inventions, and cannot properly be admitted in one application under the rules of the office. To save time the office will now present its ob-
431 jections to granting the first clause of the claim in the application.

1st. The patent recites a condition of the art that involves a substantial anticipation of this clause of the claim. 2d. The original specification, dated October 8th, 1845, expressly disclaims the

whole machine, while the first clause virtually embraces the whole machine. 3d. From these facts it is proper to presume that the invention claimed as broadly as his knowledge of the existing state of the art would justify him in doing; and his claims were accordingly limited to specific devices, as the improvements of his invention. 4th. The invention can only be explained by the as-
432 signees as experts, and even then their explanation must be regarded as that of interested parties. 5th. The recital in the application is new matter, for there is no such limitation as it presents in the recital of the patent.

When you elect the clause of the claim on which you prefer to have the present application examined, the office will pronounce a decision.

Respectfully yours, etc.,
433 C. MASON, *Com.*

ST. JOHN, BURR, WRIGHT, and RIBLET,
Care A. P. BROWNE, *New York.*

Amendment—Sept. 15, 1856.

We hereby amend the specification of our application for the reissue of the letters-patent granted to Henry A. Wells, bearing date the 25th day of April, 1846, for improvements in the process of, and machinery for, making hat bodies of fur, which said
434 application was filed on the 4th day of Sept., inst., by striking out on the first page all after the 17th line, down to the word "hat" in the last line, and substituting in lieu thereof the following, namely: ["It has long been essayed to make hat bodies by throwing the fibres of fur, wool, etc., by a brush or picker-cylinder, on to a perforated cone, exhausted by a fan below, to carry and hold the fibres thereon by the currents of air that rush from all directions towards and through the apertures of the cone, and thus form a bat of fibres ready for hardening and felt-
435 ing, but from various causes all these attempts have failed."*]

And we further amend the said specification by striking out from the 7th to the 14th line inclusive on the third page, and also by striking out the last section of the claim comprised in the last nine lines of the last page.

CHARLES ST. JOHN,
H. A. BURR,
A. H. WRIGHT,
JAMES M. RIBLET,
By their attorney, CHAS. M. KELER.

436 Washington, D. C., Sept. 15th, 1856.

*A—Insert at A, page 1. See p. 102.

Reissue.—W.—No. 400.—*Division.*

Charles St. John, Henry A. Burr, Albert H. Wright, and James M. Riblet, assignees of Henry A. Wells, deceased, of New York, county of New York, State of New York.

Hat Bodies.

437 Received, September 16th, 1856.
Petition, " " "
Affidavit, " " "
Specification, " " "
2 drawings, " " "
Model, old.
Cert. dep.
1 cash $30, Sept. 16th, 1856.
Examined, Baldwin, Sept. 19th, 1856.
438 2 issue, Shugert, Sept. 22, 1856.
4 patented April 25th, 1846.
Reissued Oct. 7th, 1856.
Recorded vol. 4, page 235.
H.

A. P. BROWNE,
New York.

Application for Reissue, No. 400.

To all whom it may concern:

Be it known, that Henry A. Wells, late of the city, county and State of New York, now deceased, did in his lifetime invent
439 certain new and useful improvements in the process of, and machinery for, making hat bodies of fur, for which said improvements letters patent of the United States were granted to the said Wells, bearing date the 25th day of April, 1846, of which the following is a full, clear, and exact description of the principle or character which distinguishes the said invention from all other things before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this description, in which fig-
440 ure 1 is a plan of the machine; figure 2, a longitudinal vertical section; and figure 3 a longitudinal elevation. The other figures will be described in their appropriate places. The same letters indicate like parts in all the figures.

[It has long been tried to make hat bodies by throwing the fibres of fur, wool, etc., by a brush or picker-cylinder, on to a perforated cone, exhausted by a fan below, to carry and hold the fibres thereon by the currents of air that rush from all directions towards and through the apertures of the cone, and thus

form a bat of fibres ready for hardening and felting; but from various causes, all these attempts have failed.*]

Hat bodies are required to be made thick at and near the rim, and thin along the crown and tip, that the required strength may be given where it is required, without making the hat too heavy, and at too great a cost of material. This disposition of the fur can be obtained by the skill and judgment of the workman by the hand process, known under the name of "bowing," but cannot by the plan above referred to, for the reason that the fibres are only controlled by the currents induced through the apertures of the cone, or other form, by the exhaust, instead of being thrown, and properly directed for distribution on to the cone, or other form. When the fibres are not properly thrown and directed, but are drawn to the surface by the action of the exhaust, the force thus induced gradually decreases, as the apertures in the cone are closed up by the accumulation of the fur deposited on the outer surface thereof, and in consequence the impelling force which carries the fibres becomes insufficient to control the force of gravity which will then prevail, and cause the fibres to accumulate to a greater thickness on the tip of the cone, where much less is required than below. And the said suggested plan cannot produce a practical result for the further reason, that there is no mode described by which the bat of fur fibres can be hardened while on the cone, that it may be removed from such cone preparatory to the after and well-known process of sizing or felting.

The invention of the said Henry A. Wells, by which the required practical result was obtained, consists in forming the bat of fur fibres on a perforated cone, or other form, in the manner substantially as above described, in combination with the hardening of such bat while on such cone or other form, to give it the required consistency to admit of taking it off in a suitable condition for sizing by the well-known process of felting.

In the accompanying drawings, *a* is a frame properly adapted

*The above is the reading as amended: the original is as follows: "It has long been suggested and described that hat bodies might be made of fur by knocking the fibres from the doffer of a carding machine by a rotating beater, to suspend them in the atmosphere over a perforated cone or other form, and drawing such fibres on to the surface of such cone or other form, by exhausting the air from the inside, thereby inducing currents of the surrounding air, in which the fibres are suspended to travel towards and through the perforations, and thereby deposit and hold such fibres of fur on the outer surface of such perforated cone or other form, with the view to form a bat, to be afterwards felted into a hat body. But such suggested or described plan never did, and never can answer a practical purpose for making hat bodies, for several reasons. Fur cannot be successfully worked in what is known as a carding machine, on account of being too light to be properly acted upon by the carding operation."

to the operative parts of the machine, and *b* the lower feed-apron, on which the stock is spread by the attendant in separate parcels, each sufficient for the formation of a hat according to its in-
446 tended weight. This apron, or endless belt of cloth, or other suitable material, passes around a roller *c* and a lip *d*, the former at the back of the machine with its bearings in sliding-boxes, governed by set screws *e*, *e*, for the purpose of tightening the apron, and the latter near to the rotating brush *f*, and so formed as to present a slightly rounded edge for the apron to pass over, where it presents the fur to the action of the brush. Instead of this slightly rounded edge, a small metallic roller may be substituted; but when this is done, the roller should be sup-
447 ported at different points between its end journals, and this he effected by letting it run in a circular groove in the lip, as represented in section at figure 4, where *g* indicates this roller. The fur, as it is carried along towards the lip *d*, is gradually compressed by the upper apron b^1, which passes around a feed-roller c^1 and lip d^1, in manner similar to the under feed-apron. The roller c^1 runs in a frame *i* (of which the lip d^1 forms part) hung on journals that rest in standards *j*, so that the lip d^1 can
448 be made to press on to the fur between it and the under lip *d*, and thus gripe the fibres and present them to the effective action of the brush *f*. The under plane of the upper apron b^1 is inclined to the upper plane of the lower one, *b*, the more effectually to present the fibres in the proper manner to the brush.

The roller c^1 of the upper apron runs in sliding-boxes, governed by set screws e^1 e^1, and is placed forward of the journals of the frame, so that the tension of the belt i^2, which communicates motion from the lower roller *c* to the upper one c^1, may press the upper lip d^1 on the under lip *d*; but this may
449 be effected by means of springs, weights, or other well known mechanical devices for making pressure under similar circumstances.

The fibres, as they pass from the feed-aprons, are acted upon by a brush *f* that rotates with great velocity, and which is composed of parallel rows of stiff bristles projecting from a cylinder, but which may be differently constructed and composed, if desired. As the fibres are first presented they are brushed and properly laid, by the downward action of the brush, as indicated by the arrow, and when liberated are carried down the curved surface
450 *l* of a chamber or tunnel *m*; and at the lower edge of this they meet a current of air (that enters a narrow aperture *n*, near the bottom of the chamber, and extending the whole length of the brush,) which being induced by the rotation of the brush and the partial vacuum in a perforated cone, prevents the fibres of fur from falling and resting on the bottom of the cham-

ber, and carries them on to the perforated cone *o*. This
451 chamber extends over and under the brush and the forward part of the lips, and turns on the journals of the brush, or is otherwise so arranged as to have a slight motion, the axis of which is the same as that of the brush. Its bottom rests on a set screw *p* to regulate the delivery-end of the chamber relatively to the cone. Its forward end, in addition to this, is provided with a hinged flap *q*, regulated by a cam lever, as a means of regulating the delivery of the fibres. Its top *r* is gradually elevated and sides contracted to make the delivery-aperture nearly of the form of the cone, but narrower and higher; and its upper part
452 is provided with a hood *s* so curved as to correspond generally with the curve of the tip of the cone. This hood is hinged to the upper part of the delivery-aperture of the chamber, and is connected with an eccentric *t* by means of a cord *u* and bell-crank u^1 that passes over a pulley r^{11}, so that each revolution of this eccentric carries the hood up and down to direct the discharge and distribute the fibres on to the cone—a greater thickness being desirable in the parts of the bat which form the brim than on the tip and crown; and when it is desired still
453 further to diversify the distribution of the fibres, a cam can be substituted for the eccentric, and the connection between it and the hood is formed as represented in section at figure 5, where the cam *t* acts on a lever t^1, connected with the hood *s* by the cord *u*.

The cone *o* is made in the usual manner, but of thin sheet-metal, perforated, instead of wire-gauze. Its lower edge fits in a metallic ring *w*, that runs in an appropriate collar in the upper part of a case *x*, and its outer periphery is provided with
454 cogs that mash into the cogs of a pinion *y*, (concealed in the drawing by the pulley d^2,) on a vertical shaft *z*, by which a slow rotary motion is given to the cone, as the fibres are thrown on to it, to distribute them equally all around the cone. The case *x* is sufficiently long to receive two rings *w*, one on each side of the pinion *y*, by which both are kept in motion, and it (the case) is made to swivel on a hollow collar f^1, to which its bottom is fitted, so that when one cone is covered it may be turned aside by turning the case half a revolution, and another cone put on to the other ring, that another bat may be in
455 the process of forming, whilst the one already formed may be prepared for the hardening process in the manner to be hereafter described.

The case *x* communicates through the hollow collar f^1, with an exhausting fan-blower g^1, which consists of a vertical arbor h^1, with oblique vanes i^1, so that when rotating with great velocity in the direction of the arrow, the air is exhausted

from the case x and the perforated cone o. When one of the cones is removed from one of the rings w, to be taken
456 to the hardening apparatus, the aperture in the ring w must be closed up with a cap-plate w^2 to prevent the access of air. Any other mode of exhausting the case and cone may be employed, but this is the most efficient which he (Wells) essayed.

The preparation of the formed bat for hardening is effected by covering it with pieces of felt or fulled cloth, just taken from hot water, and this is done in the following manner, namely: the attendant takes from a kettle of hot water a piece of felt cloth, rolled upon a roller, and applies one end of it to the surface of
457 the bat, and as the cone rotates, the felt cloth winds from the roller on to the bat on the cone. Another piece of felt cloth is put on the top, and then a strong perforated metallic cone k^1 (see figure 6) is put over the whole, the more effectually to hold the fibres of the bat, and to make a slight pressure on them whilst it is immersed in hot water to harden. As the perforated cone o is better when made very thin, the pressure of the water when drawing it out of the kettle, after the bat has been hardened, tends to, and would collapse it, and therefore, to prevent this, another
458 perforated metallic cone l^1 (see figure 7) is put inside, (before the whole is immersed in hot water,) to sustain the pressure in drawing the whole out of the hardening kettle. The relative situation of the three cones, the bat and the covering felt cloth, preparatory to the hardening process, is represented on an enlarged scale at figure 8, which is a vertical section through the whole. The inner sustaining cone may be dispensed with, if desired, by making the cone o of greater thickness and strength.

All the operative parts may be set in motion by any of the
459 known means, such as belts, as fully represented in the accompanying drawings, in which m^1 is a main line shaft, overhead, driven by any first mover. From a wheel n^1 on it, a band o^1 extends to a pulley p^1 on the shaft of the brush, which should make about two thousand revolutions per minute, more or less. From another wheel q^1, on this same shaft, a band r^1 extends to a pulley s^1, on the shaft of which there is a wheel t^1, that drives the exhaust fan g^1 by the belt u^{11}. And from a pulley v^1 on the same line shaft, a belt extends to a wheel w^1, on the shaft of which there is a pulley x^1, from which extends another belt y^1 to wheel z^1 on the shaft a^2 (that carries the eccentric t), to give all the reduced motions required for
460 the other parts of the machinery. From a wheel b^2 on this shaft, a belt c^2 extends to a pulley d^2 on the shaft z that rotates the cone o. And another pulley e^2 drives the wheel f^2 of the feed-roller c by the belt g^2, and on the other end of the axle of this feed-roller there is a pulley h^2 which drives by a cross-belt i^2 the upper feed-roller c^1. If desired, an alarm
461 can be connected with the feed-roller of the lower apron to

announce to the attendant when each charge of stock is exhausted, that the cones may be shifted. This can be done by connecting the arbor of the feed-roller *c* of the lower feed-apron, by a belt, with a wheel k^2 provided with a cam or pin, to lift, at every revolution, the hammer l^2 of a bell m^2, the striking of which shall give requisite indication.

It will be obvious from the foregoing, that the hood may be operated by hand instead of machinery, thus substituting the attention, skill, and cost of an operative for the positive regularity and cheapness of mechanical movements. It may be well to add, as
462 a mere matter of precaution, that this invention is not limited to the making of hat bodies, but to the making of bats on formers of any other shape or configuration, the form of the delivery aperture of the chamber and the hood, and the movements of the latter, being properly adapted to the change of form of the perforated mould or former, with the restrictions indicated.

Having thus described the mode of application of the said invention of the said Henry A. Wells, as the same was successfully reduced to practice by him, we do not wish to be understood as limiting the claim of invention to such mode of
463 application, as other modes may be devised, operating on the same principle, or having the same mode of operation, and only differing therefrom in the substitution of equivalent means.

What we claim as the invention of the said Henry A. Wells, deceased, in the process of making fur hat bodies, is the forming of the bat of fur fibres on a perforated cone, or other form, in manner substantially as described, in combination with the hardening of such bat, while on such cone, or other form, to give it the required consistency to admit of taking it off in a suitable condi-
464 tion for sizing by the well-known process of felting, substantially as described.

CHARLES ST. JOHN,
H. A. BURR,
A. H. WRIGHT,
JAMES M. RIBLET.

WM. H. BISHOP,
ALEX. PORTER BROWNE,
Witnesses.

To the COMMISSIONER OF PATENTS:

The petition of Charles St. John, Henry A. Burr, Albert
465 H. Wright, and James M. Riblet, all of the city, county, and State of New York, respectfully represents:

That letters patent of the United States, bearing date the 25th day of April, 1846, were granted to Henry A. Wells, a citizen of the United States, and then residing in the city, county, and State

of New York, for improvements in the process of, and ma-
466 chinery for, making hat bodies of fur, which said letters patent, and all the right, title, and interest in and to the same, has passed by assignment, and is now vested in your petitioners.

That the said Henry A. Wells is now deceased, and after the transfer and assignment of the said letters patent to your petitioners, and after the decease of the said Henry A. Wells, your petitioners were advised counsel learned in the law, that the said letters patent are inoperative to secure the said invention de-
467 scribed in the said letters patent, by reason of a defective and insufficient specification, which information your petitioners verily believe to be true, which said defects have arisen from inadvertence and mistake, and without any deception or fraudulent intention.

That thereupon your petitioners did, on the 2d day of September instant, pray permission to surrender the said letters patent, and the reissue thereof for the unexpired term of the said original letters patent, on an amended specification, which was filed by them in the Patent Office of the United States on the 4th
468 day of September instant. That on the examination thereof by the duly authorized officers of the department, your petitioners have been officially advised that the said amended specification has been adjudged to cover two substantive inventions, which cannot, under the rules of the department, be covered by one patent.

That upon the judgment of the department so pronounced, your petitioners have restricted their said specification in conformity with such requirement, and they pray that additional letters patent may be granted to your petitioners for the residue of the
469 unexpired time of the said original letters patent, covering the other part of the said invention of the said Henry A. Wells, on an amended specification herewith submitted, in accordance with the provisions of the fifth section of "An act in addition to an act to promote the progress of science and the useful arts," approved March 3d, 1837, they having paid thirty dollars into the treasury of the United States for the said additional patent, and complied in all other respects with the requirements of the law.

CHARLES ST. JOHN,
H. A. BURR,
470 A. H. WRIGHT,
JAS. M. RIBLET.

STATE OF NEW YORK,
City and County of New York, ss.

On this 13th day of September, A. D. 1856, before me personally came Charles St. John, H. A. Burr, A. H. Wright, and

James M. Riblet, and being severally duly sworn, each for himself, did depose and make oath that the foregoing petition, by him subscribed, contains the truth, the whole truth, and nothing but the truth.

471 PETER T. MARSELIS,
Com. of Deeds.

STATE OF NEW YORK,
City and County of New York, ss.

On this 13th day of September, 1856, before me personally came Charles St. John, H. A. Burr, A. H. Wright, and James M. Riblet, and being severally duly sworn, each for himself, did depose and say, that the contents of the foregoing specification, by him subscribed, are true.

472 PETER T. MARSELIS,
Com. of Deeds.

Hon. COM. OF PATENTS:

SIR: We hereby appoint Alex. P. Browne (in connection with Charles M. Keller as counsel) to act as our attorney in presenting the enclosed application for the reissue of Henry A. Wells's patent, dated April 25th, 1846, for making fur had bodies.

CHARLES ST. JOHN,
H. A. BURR,
473 JAS. M. RIBLET,
A. H. WRIGHT.

New York city, Sept. 13, 1856.

U. S. Circuit Court, district of Connecticut.

1 H. A. BURR, ALBERT H. WRIGHT, and J. M. RIBLET, vs. GEORGE E. COWPERTHWAITE and ALVA B. TAYLOR. } In Equity.

UNITED STATES OF AMERICA,
Southern District of New York,
2 *City, County, and State of New York, ss.*

Be it remembered, that on this 28th day of September, in the year of our Lord one thousand eight hundred and fifty-seven, I, R. E. Stilwell, a commissioner duly appointed by the circuit court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United
3 States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil

causes depending in the courts of the United States,' " passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, in the city of New York, in the said southern district of New York, in the State aforesaid, Benson Bidwell, to testify and
4 the truth to say, on the part and behalf of the complainants, in a certain suit or matter of controversy now depending and undetermined in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet, are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants.

And the said Benson Bidwell, being about the age of thirty-three years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the
5 truth, in the matter of controversy aforesaid, I did carefully examine the said Benson Bidwell, and he did thereupon depose, testify, and say as follows, namely:

Question 1. What is your name, age, residence, and occupation?

Answer. My name is Benson Bidwell; age 33; reside in Danbury, Connecticut, and am a hatter.

Q. 2. Do you know George E. Cowperthwaite, one of the defendants in this cause? If yea, how long have you known
6 him?

A. I do. I have known him since a year ago last winter.

Q. 3. Have you ever worked for him; and if so, in what establishment, and from what time to what time?

A. I worked for him last winter; commenced on the 25th November, 1856, and worked for him to the 22d or 23d January, 1857. I worked for him at the Sheler Rock factory, in Danbury.

Q. 4. What business was the said Cowperthwaite en-
7 gaged in at that time?

A. He was forming hat bodies.

Q. 5. By machinery or by hand?

A. By machinery.

Q. 6. Examine model marked Exhibit A, on the part of the plaintiffs, and state whether the machine or machines used by the said Cowperthwaite was or were like it; and if not like it, in what particulars did it or they differ from it?

(Question objected to on the part of the defendant, on the
8 ground, first, that the time that the witness worked for Cowperthwaite was not before the commencement of this suit, or at any rate the time he states that he commenced was on the day preceding the day on which the bill was sworn to, as appears from the copy served on the defendant, and all evidence of

matters other than those which took place prior to the verification of the bill is objected to; and also on the ground that the witness is not a machinist, and therefore not a proper witness to
9 prove similarity or differences in machinery by.)

A. I should think it was something of a similar machine, but the proportions are not like, I shouldn't think. The distance in this model between the cone and the pickers is greater than in the machines. There is not as much slant on the top of the exhaust-box in this model as in the machines. I should think the pickers are larger in proportion, and set up higher above the apron, in this model, than in the machines. This may be on account of the pickers being too large. This (pointing to the tin cap
10 over the pickers in the model) is different. The top surface of the cap is flat in the machines, and inclined, (the witness pointing to the inclination,) which is about 50 degrees from the horizontal.

Q. 7. Was the forward edge of the inclined cap-board to which you have referred projected forward or back of the forward line of the picker-rollers?

A. I should think about perpendicular over the front edge of the picker-roller.

Q. 8. About how far was the lower edge of the cap-board
11 from the feed-apron?

A. It came down very nearly to the top of the upper feed-roller.

Q. 9. How many such machines did Cowperthwaite have in his establishment when you first went to work for him?

A. Three was all I saw.

Q. 10. Did all three of them remain there during all the time you worked for him?

A. They were all there. One was taken down.

12 Q. 11. About how long after you left there was that one taken down?

A. It was taken down before I left there.

Q. 12. Were the bats hardened in any manner on the machines before they were taken off the cones?

A. They were hardened by the jiggering cone. After the hat was formed on one cone another perforated cone was put over it, and then moved around about one-third of a circle, and a longitudinal jiggering motion given to the outer cone by a vibrating roller and arm.

13 Q. 13. Did the outer perforated cone fit the hat, or was it larger; and if so, how much?

A. It was shorter than the inner cone, but larger around. They were not all of a size. Some were larger, and some smaller.

Q. 14. About how much larger? Give an average.

A. I should think two inches in diameter.

Q. 15. Was the outer cone as long or shorter than the bat formed on the inner cone?

A. The same length as the bat.

14 Q. 16. Was the exhaust withdrawn from the cone during the hardening by the jiggering motion, or was it continued?

A. I think it was continued.

Q. 17. How was the fur fed on the apron?

A. By a boy generally.

Q. 18. Was the fur fed on the apron of an equal thickness or of an unequal thickness? and if the latter, state how and for what purpose.

A. It was fed on of an unequal thickness, to get the right

15 lay of the bat; the heaviest at the brim, and taper up.

Q. 19. Was any steam discharged for any purpose in the room in which these were worked?

A. Not to my knowledge.

Q. 20. Was not the hardening of the hat bodies, after they were removed from the cone, completed by hand in the establishment?

A. They were.

Q. 21. In what part of the establishment?

A. In the same room with the machines.

16 Q. 22. Was hot water used in this hardening process by hand?

A. Steam was used in hardening, and the water heated to produce the steam.

Q. 23. Did any portion of this steam used for hardening escape into the room?

A. When they put the hats in and took them out, there did some escape into the room from the drawers in which the hats were put.

Q. 24. About how far was this steaming apparatus from

17 the cones on either of the machines?

A. About four or five feet, perhaps six feet from the cone on which the hat was being formed on one of the machines—on the middle machine—another machine being on each side of that one. The apparatus is on that side of the machine on which the exhaust-box is.

Q. 25. Explain in what direction the fur travelled from the pickers on to the cone.

A. It travelled from the picker, and covered perhaps two-thirds of the cone—that is, the body of the fur; there was other fur

18 flying all around the cone.

Q 26. Did the cone stand still, or was it firm on its axis?

A. It was in motion all the time the machine was in operation.

Q. 27. What was the object in making the cone turn all the time?

A. It formed the bat even.

Q. 28. Did the fur which was thrown by the pickers strike in equal thickness over the two-thirds of the cone at any one
19 time?

(Objected to, because it don't appear that the witness is either an expert in those matters, to justify the use of an opinion, or that he experimented to ascertain such fact.)

A. It did not in equal thickness; it tapered each way. It fell thicker right straight from the pickers.

Cross-examined by Mr. Gifford.

X 29. You have mentioned that a steaming apparatus was in the room where the machines were used. Why was such
20 apparatus placed in that room?

A. It was to steam the hats, and finish the hardening.

X 30. Why was it not placed in another room?

A. Well, I suppose it was because it was handy to get the hats, and to save trouble of travel in going to and from the other room.

X 31. At the time you worked for Mr. Cowperthwaite, which machine was used most, the one nearest to the steaming apparatus or one of those farthest from that apparatus?

A. When there was only one running, the furthest off
21 was run.

X 32. Please describe how that steaming apparatus was made, and of what material.

A. Well, I should call it a stove with a potash kettle upon it. There was a box built of the style of a bureau, of wood, with three or four drawers in it. This bureau didn't cover the whole kettle, but two-thirds of it, I should think. What it did not cover, was covered with a board fitted in. The bottom of the bureau was out, so that the steam went up through every drawer.

22 X 33. How did the steam get up through the drawers?

A. Instead of having the drawers tight, the bottoms of them were slats, which let the steam up.

X 34. How large was that box which you say was made something like a bureau?

A. I should think it was between two and three feet high, and about the same length, and I should think about eighteen or twenty inches wide.

X 35. Did the drawers pull out at the side or end of that box?

23 A. At the side.

X 36. Did the drawers pull out on the side of the box next to the machine, or otherwise?

A. On the opposite side.

X 37. Please state whether or not you was careful in the use of that box to prevent the steam from coming out into the room.

A. We were careful to save all the steam we could, and have it as hot as we could.

X 38. You mean save it in the box, I suppose?

24 A. Yes.

X 39. After the hats were jiggered on the machine as you have stated, what was next done to the hat?

A. It was taken off and inspected.

X 40. After inspected, what was next done to it?

A. It was laid on the bench and cropped, which means straightening the edges.

X 41. How, or with what were the hats cropped after being laid upon the bench?

A. They were cropped with the hands.

25 X 42. After so cropped, what was next done to the hat?

A. They were folded up, sometimes one and sometimes two folds.

X 43. For what purpose were they so folded?

A. To put into the steam box or drawers, and steamed.

X 44. Did you lay them in the drawers folded up?

A. We did.

X 45. How long have you been a hatter?

A. I went to the trade when I was 17 years old, but have

26 not worked at it all the time since.

X 46. Are you acquainted with the old way for forming hats for hat bodies, called bowing; and if yea, how long have you been acquainted with that process?

A. I am acquainted with it. I became acquainted with it when I went to my trade, over fifteen years ago.

X 47. In forming a bat for a hat body by that old bowing process, was or was not the fur deposited in regulated different thicknesses in forming the bat?

A. It was bowed thicker at the brim, and so tapered up.

X 48. What was the object in depositing the fur thickest

27 at the brim part of the bat?

A. To get the right proportion in the bat.

X 49. Was it not the same object for which the fur was deposited thickest on the brim part of the bat at Cowperthwaite's place?

A. It was.

X 50. In the formation of bats for hat bodies by that old bowing process, is it not then hardened by the application of water in the form of wet cloths or otherwise?

28 A. It is hardened by a wet or damp cloth.

X 51. After the bat made by the bowing process has been hardened by wet or damp cloths, what is next done to it?

A. The two bats are then put together.

X 52. In the operation of Mr. Cowperthwaite, after the bats

have been hardened in the steam drawers, are they not still further hardened; and if yea, how?

A. They are, by being rolled and folded in a cloth.

X 53. Do you remember that in the use of the Cowper-
29 thwaite machines which you have mentioned, the stand which sustains the cones revolved upon its axis, so as to carry away the cone after the bat was formed on it, and to bring another in its place?

A. It did, and it was turned by hand.

X 54. When so turned, was not the cone attached to it low enough to pass under the lower picker and sides on the picker frame, as the stand was being turned?

A. It was.

X 55. Do you know whether the chamber from which the
30 air was exhausted communicated with all the cones supported by that stand, and at the same time?

A. I should think it did. I never took particular notice.

X 56. Don't you remember that after the cone with a bat on it was turned away from the jiggering part of the machine, where the bat was to be taken off of the cone, that a blast of air was then let up into the interior of that cone to assist in removing the bat from it?

A. I think there was.

31 X 57. Well, then, at the time such blast of air was caused to pass up into the cone to produce pressure to remove the bat from the cone, the air could not at that particular time have been exhausted from that cone?

A. Well, I think the bat couldn't have been taken off of the cone with the exhaust on, and the exhaust must have been at that particular time taken off of that cone.

X 58. You have mentioned "that after the bats were removed from the cone in the operation of Cowperthwaite, they were steamed;" was not the only object of that steaming to damp-
32 en them, so that they could be thereafter hardened by rubbing them?

A. It was.

X 59. In the model marked Ex. A, on the part of the plaintiffs, you see in the rear of the pickers a copper plate, do you not?

A. I do.

X 60. At the time the counsel for the complainant questioned you in your direct examination in reference to a cap, did he
33 or not have another metallic cap over that copper one?

A. He did.

X 61. In your answer to this question on that subject, did you mean to be understood that Cowperthwaite's machine had two caps or only one?

A. Only one.

X 62. Do you know what would be the effect of that copper plate without any other in that machine?

(Objected to, as the witness has not been produced on the part of the plaintiffs as an expert, and the question asks for an
34 expert's opinion.)

A. I don't know that it would have any particular effect.

X 63. You have spoken in your direct examination of a cap the front edge of which you thought would come even in a vertical line with the front of the picker. Please state how high above the picker the front edge of that cap projected.

A. I should think about an inch.

35 X 64. Were the pickers of the machines of Cowperthwaite always used while you were there in the same position relatively to one another?

A. I think they were.

X 65. How large in diameter was each of those pickers, from the outer end of the teeth?

A. I should think the wood was about three and a half inches, and the pins projecting about a quarter of an inch, making in the whole about four inches.

X 66. How wide was the cap which you say was on the Cowperthwaite machines?

36 A. I should think about four inches.

X 67. In the use of the Cowperthwaite machines did you ever stop or take off the exhaust, and run the rest of the machines, and observe where the fur then went from the pickers?

A. I never did it; I have seen it done.

X 68. Who did you see do it?

A. The man that run the machine.

X 69. Did not the fur in that case go over and beyond the
37 cone?

A. It did all around.

X 70. Did it not go as much as six feet beyond the cone, some of it?

A. It did.

X 71. Did it not scatter throughout the room?

A. It did scatter throughout that part of the room; I don't know that it did all over the room.

X 72. In the use of the Cowperthwaite machine, with the exhaust, have you not observed the exhaust pulling the fur down to the cone which would otherwise have gone over it?

38 A. It drew the fur to the cone.

Direct resumed by Mr. Keller.

Q. 73. When you saw the Cowperthwaite machine working without the exhaust, did the whole of the fur scatter, or did a portion travel in a straight line; and if so, in what direction?

A. It scattered all about the room, and when some of it came in contact with the belts and travelled with them, some of it travelled in a straight line; it took no particular course; it fell around
39 the room.

Q. 74. Did any of it strike against the cone?

A. I should think it did.

Q. 75. In what direction did that travel from the pickers to reach the cone?

A. The cone was not then in its usual position; it was when the belt had come off. The cone was then in the position marked on Exhibit A by the marks cut with a knife on the exhaust-box and the cone-box.

Q. 76. Could you see on the Cowperthwaite machines any portion of the picker over the edge of the cap when coming up
40 the rear part of the machine?

A. I don't think I could.

Q. 77. You say that when you saw the Cowperthwaite machine working without the exhaust, the fur was thrown about six feet beyond the cone. Will you state in what direction beyond the cone?

A. Most of it went right ahead; it didn't go back; it scattered all over the room.

Q. 78. Did the exhaust-fan discharge the air from the
41 machine into the room or below the floor out of the room?

A. Below the floor out of the room.

Q. 79. On your cross-examination you have stated "that after the bats were removed from the cone they were steamed, and then hardened." Did you mean to be understood from that, that they were not hardened at all on the cone?

A. They are only partly hardened on the cone.

Q. 80. Was the steam-box of the steaming apparatus steam-tight so that steam would not escape from it?

A. It was not.

Q. 81. When the machine and the steaming apparatus
42 were in operation, were the windows kept open at any time?

A. When it was very warm the windows were hoisted a little; it was winter when I was there, and it didn't require it.

Cross resumed.

XX 82. Did you not form the bats by the use of the machine frequently while you had no steaming going on?

A. We did.

Direct resumed.

43 Q. 83. Did you continue forming bats on the machine for any length of time when the steaming apparatus was not in operation?

A. We did not while I was there.

Cross resumed.

XXX 84. Was it not frequently two or three hours in the morning before you could get up steam, and at the same time the machine was running, and the bats being formed and removed from the cones?

A. Very often the machine was running before we got up
44 steam, but not for that length of time, I don't think. It was sometimes an hour; it was more or less.

XXX 85. Was it necessary at all to have your steaming going on to enable you to form the bats on the cone by the use of the machine, or to take them off the cone after they were formed?

(Objected to, as a question that calls for an expert's opinion, and witness has not been called as an expert.)

A. It was necessary to have a fire, as we couldn't work
45 with cold fingers; but I don't think it was necessary to have steam.

BENSON BIDWELL.

Sworn to before me, this 28th Sept., 1857.

R. E. STILWELL,
U. S. Com.

UNITED STATES OF AMERICA,
Southern District of New York,
City, County, and State of New York, ss.

Be it remembered, that on this 28th day of Sept., in the year of our Lord one thousand eight hundred and fifty-seven, I, R. E.
46 Stilwell, a commissioner duly appointed by the circuit court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th,
47 1789, did call and cause to be and personally appear before me, at my office, in the city of New York, in the said southern district of New York, in the State aforesaid, William Booth, to testify and the truth to say, on the part and behalf of the complainants, in a certain suit or matter of controversy now depending and undetermined in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet, are complainants, and Alva B. Taylor
48 and George E. Cowperthwaite are defendants.

And the said William Booth being about the age of

forty years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said William Booth, and he did thereupon depose, testify, and say as follows, namely:

Question 1. What is your name, age, residence, and occupation?

49 A. My name is William Booth; thirty-one years old; Danbury, Conn., and am a hatter.

Q. 2. Have you ever worked for George E. Cowperthwaite, one of the defendants; and if yea, in what business, and from what time to what time, and at what business?

A. I have. From the last of Oct., 1856, to 23d or 24th October, at the hardening of hat bodies.

Q. 3. During the time that you so worked, did the said Cowperthwaite make hat bodies by machinery?

50 A. He did.

Q. 4. How many machines did he have for that purpose?

A. He had three while I was there.

Q. 5. Look at the model, Exhibit A, on part of plaintiff, and state whether it is like or different from said machines; and if different, in what respects?

A. I think the cone is farther off from the pickers in the model than it was in the machine. The picker-rollers look larger in proportion than in the machine, and his machine had a cap which covered the upper picker.

51 Q. 6. When the machine was in operation, what direction did the fur travel from the pickers to the cone?

A. From the feeder the main portion struck the centre of the cone. I used to harden on the cone—that is, after the bodies partly hardened by the jiggers, and after it went from the jiggers the boy used to finish hardening it by hand.

Q. 7. While the fur was thrown on to the cone, did the cone stand still or rotate?

A. It rotated.

Q. 8. Was anything done with the air inside of the cone

52 while the fur was being thrown on the outside?

A. There was nothing done with it that I observed.

Q. 9. Was there any machinery inside the case with which the cones are connected?

A. No, not that I observed.

Q. 10. Did you observe a belt passing from any of the driving shafts of the machine to a pulley near the base of the case to which the cones are attached?

A. Yes, sir.

Q. 11. What did that pulley drive?

53 A. I suppose it drove the cone.

Q. 12. Did it drive anything else?

A. The jigger apparatus, I suppose.

(Answer to suppositions objected to.)

Q. 13. Was there any exhausting-fan to draw air from any part of that machine; and if so, what part?

A. Yes, sir, there was. It appeared to me to draw it from the pickers.

Q. 14. Where was that fan situated?

A. That was situated below, I think.

54 (Objected to, because he don't know.)

Q. 15. How was the fur fed from that machine.

A. It was fed by a boy.

Q. 16. Where did he put the fur?

A. On the feeder.

Q. 17. Was the fur laid upon the apron in equal thickness, or otherwise; and if so, how otherwise?

A. It was not. It was laid so as to have it thicker in the band, and have it taper towards the tip, so as to have it in proportion.

55 Q. 18. Was there any steaming apparatus in the room in which these machines were used?

A. There was.

Q. 19. Was that apparatus steam-tight, so that steam did not escape into the room, or did it allow steam to escape into the room?

A. It allowed some portion of the steam to escape into the room in drawing the drawers out. The drawers were continued to be drawn out during the whole day.

Q. 20. How far was that steam apparatus from the cones

56 on the machine for forming bats?

A. There was one of the cones which I call the middle cone; I shouldn't think it over three feet, but the others might be six feet or more.

Q. 21. What held the fur on to the cones after it was thrown on by the pickers?

A. That was the suction, I should think.

Q. 22. Do you know what it was?

A. I am not positive of it.

57. Q. 23. After the required thickness of fur was thrown on to the cone, what was done with it?

A. There was another cone put over the body and turned to the jigger.

Q. 24. What did that jigger do?

A. It partly hardened the body—very little.

Cross-examined by Mr. Gifford.

X 25. You have stated that it appeared to you "that there was exhausting of air, or an exhausting-fan to draw the air
58 from the pickers." State, if you can, how any such thing as that appeared to you.

A. Why, it appeared to me, as I stood by the cone, the suction appeared to come from the pickers—it so appeared to me.

X 26. Did it appear to you that it didn't come from any direction other than from the pickers?

A. It seemed so to me as I stood by the cone.

X 27. Has it ever appeared to you any otherwise?

A. No, sir, for I never examined it particularly.

59 X 28. Is that the best explanation you can give of the action of the exhaust, if there were any in it?

A. It was, as far as I observed it.

X 29. You say that the steam-chest allowed the steam to escape from out the drawers. Did you try to make it escape, or was it merely accidental?

A. I did not try to make it escape, but as a matter of course in opening and shutting the drawers it would naturally come out.

X 30. Then what escape of steam there was, was because
60 in the common use of the drawers you couldn't help it, was it not?

A. why, there was some steam that would escape whether the drawers were open or shut. It wasn't steam-tight.

X 31. Was not that a mere accidental escape, or did you try to have it escape?

A. We did not try to have it escape, for, as a general thing, we had no more steam than was necessary to steam the
61 bodies as fast as we hardened them.

X 32. Then you preferred to not have it escape, did you?

A. We preferred to not have it escape, but it would escape, because it wasn't steam-tight.

X 33. Well, sir, do you know anything about the interior of that machine, or its mode of operation?

A. I never examined it. It was not my business. My business was to harden.

X 34. You have said "that a boy did something about hardening the bat on the cone, after it was turned away from the jiggering apparatus." Did not that consist only of his rubbing
62 the jigging cone a few times upon it?

A. It did not. He hardened it after it came from this jigging apparatus.

X 35. When you say "this jiggering apparatus," what do you mean? Do you not include in that jiggering apparatus the outer cone that rubs the bat?

A. Yes, sir; I mean the outer cone.

X 36. Now, was not that outer cone still on the bat when the boy did what you call hardening?

63 A. Yes, sir, it was.

X 37. Did not what you call hardening by the boy, consist of his taking hold of that outer cone with his hands, and rubbing it against the bat?

A. Yes, that is what I call hardening, and what I mean the boy did.

X 38. You say you hardened. What did that consist in?

A. It consisted in hardening the bats after they came from the cone.

64 X 39. What did you do to harden?

A. I hardened the bats after they came from the cone. I hardened them by rubbing with the cloth with my hands.

X 40. Did you consider that there was anything new or extraordinary in that hardening by you, or was it the same kind of hardening with which you have been familiar ever since you went to your trade?

A. It was the same I have always been in the habit of doing, only they were steamed.

X 41. Did you hear Mr. Bidwell, the other witness on
65 the part of complainant, testify to-day in regard to the cap on the Cowperthwaite machine? Do you agree or disagree with Mr. Bidwell in regard to that?

A. I should disagree with him.

X 42. Who was there the longest?

A. Mr. Bidwell.

X 43. Did you ever measure the distance between any of the cones and the steam apparatus in that machine?

A. No, sir.

66 *Direct resumed.*

Q. 44. You have just stated that you heard Mr. Bidwell's statement as to the cap on the Cowperthwaite machines, and that you disagreed with him. In what respect do you disagree with him?

A. I thought the cap was perfectly level; it seemed to me so as I was looking over the picker.

Q. 45. Could you see the picker when you was standing back of the machine?

A. No, sir, I could not.

67 Q. 46. About how high was the upper picker from the floor?

A. It is my impression it might possibly have been three feet, and it was not under, and it might have been over.

Cross resumed.

XX 47. That last answer was a guess as to the height of the picker, was it not?

A. Yes, sir. I never measured it. It might have been four feet, as to that.

68 XX 48. The cap you speak of was a piece of flat board, was it not?

A. Yes, sir, it was.

Direct resumed.

Q. 49. What do you mean by the cap?

A. I mean the piece that went over the top picker.

Q. 50. Was the rear part of the picker towards the apron open or closed?

69 A. I can't say positive, but I believe they were closed.

WILLIAM BOOTH.

Sworn to before me, this 28th Sept., 1857.

R. E. STILWELL,
U. S. Com'r.

UNITED STATES OF AMERICA,
Southern District of New York,
City, County, and State of New York, ss.

Be it remembered, that on this 29th day of September, in the year of our Lord one thousand eight hundred and fifty-seven, I, R. E. Stilwell, a commissioner, duly appointed by the circuit
70 court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States,'" passed March 1st,
71 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, in the city of New York, in the said southern district of New York, in the State aforesaid, Abel F. Beardsley, to testify and the truth to say, on the part and behalf of the complainants in a certain suit or matter of controversy now depending and undetermined in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite
72 and Alva B. Taylor are defendants.

And the said Abel F. Beardsley being about the age of forty years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in

the matter of controversy aforesaid, I did carefully examine the said Abel F. Beardsley, and he did thereupon depose, testify, and say as follows, namely:

Q. 1. What is your name, age, residence, and occupation?

73 A. My name is Abel F. Beardsley; aged 40 years; reside in Danbury, Ct., and am an engineer.

Q. 2. Have you ever been in the employ of Stephen A. Hurlbut; and if yea, at what time, in what capacity, and where?

A. I have, as engineer. Two years ago the 12th or 14th of May last, I left them, at his factory in Danbury, Connecticut.

Q. 3. Have you any knowledge of any machine for making hat bodies while you were there in that establishment?

74 A. I have.

Q. 4. State whose it was; how it operated.

(Objected to, because it calls for matters which were before the issuing of the reissued patent on which this suit was brought; and the defendants' counsel further objects to all evidence of any making, using, or selling any machine or process or thing, prior to the date of the reissued patents on which this suit is brought, as no recovery can be had for any such act or thing, and any evidence in relation thereto is irrelevant.)

75 A. When it was first put in, it was called Taylor's machine—Taylor, of New Jersey, and brother-in-law of Mr. Cowperthwaite. I know that they were, from the declarations of Mr. Cowperthwaite.

(Mr. Gifford, counsel for defendants, objects to any evidence of that machine, as Mr. Taylor is not a party to this suit.

Pointing to Exhibit A, on the part of the plaintiffs, counsel for the defendants objects to the witness being led by the use of

76 a model, as it don't appear that he can give any evidence in relation to the operation of the machine to which he is referring without having it first illustrated by the use of a model.)

Witness continues: In the first place, the fur was fed on to the apron, then blown out in front of the cone by the aid of the pickers; the bat was formed the cone, by the aid of a sucker-fan, which drew the fur on to the cone. When the bat was formed on this cone it was then moved around to a jiggering motion, where it is worked under that jiggering motion, for the purpose of hardening.

77 It is worked there while another bat is forming. When the other bat is formed, that passes around to the jiggering motion; the one that remained there is then shifted around to where a boy works the outer cone with his hands, while the other bat is jiggering; he works that bat while the third bat is forming. When the third bat is formed he removes the first, and loosens the bat around the edge of the cone, and slips it from the cone.

Q. 5. In what manner was the fur fed upon the apron?

(Objected to as above.)

78 A. It was fed in a form on the apron to equalize the bat; that is, it was fed on the feed-apron in unequal thicknesses from side to side.

Q. 6. When the bat was formed on the cone, was it of equal or unequal thickness?

A. Unequal thickness; lighter at the tip and thicker at the brim.

Q. 7. By what means was the fur held on the cone, after it was deposited there by the pickers?

(Objected to as above; and further, that the question as-
79 sumes that the pickers did what they did not do, and are incapable of doing.)

A. By the aid of suction fan.

Q. 8. By what means was the bat hardened after being formed?

(Objected to as above.)

A. After it was taken from the cone it went to the bench to be hardened.

Q. 9. By what means was the bat hardened on the cone before being removed from the cone?

80 A. It was hardened in a measure by a jiggering motion in part, and in part by a boy after it passes from the jiggering motion, which the boy does by working the covering backwards and forwards with his hands on the bat. He moves the cover very slightly.

Q. 10. What was the outer cover referred to in your last answer?

A. It is a cone in a form of a cone, and is made different from the inner cone; it has a knob on the end which attaches to the jigging motion. It is the same cover which the boy uses after
81 it passes from the jigger.

Q. 11. Was this outer cone of the same or greater diameter than the inner cone; and if the latter, how much greater?

A. It was larger than the inner cone.

Q. 12. Was it solid or perforated?

A. It was perforated.

Q. 13. You have stated that during the operation of forming the bat, the fur is held on by the action of an exhausting-fan; during what period of the entire series of operations on the machine
82 is the action of the exhaust removed from the fur bat?

A. The exhaust is taken off when it passes around to the boy, by the sction of the machine.

(During the description of the machine by the witness there was no model present, the model having been removed immediately after the objection by defendants' counsel.)

Q. 14. Look at model Ex. A, on the part of plaintiffs, and state whether it be a correct representation of the machine at the Hurlburt factory to which you have referred, or whether it differs
83 therefrom; and if the latter, in what respect does it differ?

A. In the first place the exhaust-box of the model; the top of the exhaust box should be more of a slant. The pickers are represented larger in the model in proportion to the size of the other parts. The sides of the picker-frame should be a trifle higher on the model. There was a curved cap over the pickers extending from the top feed-roll over the upper picker to nearly the
84 front edge of the picker. I don't see any other material difference.

Q. 15. You have stated "that when this machine was first brought to the Hurlburt factory, it was called Taylor's machine;" will you state under whose direction it was operated?

A. George E. Cowperthwaite.

Q. 16. How long did it remain in the Hurlburt factory?

A. It was put in there in the month of February, 1855, and remained until about the middle of May, 1855.

Q. 17. What was done with it then?

A. It was then taken out and removed to a place called
85 "Shelter Rock factory."

Q. 18. How do you know that when it was first brought to Hurlburt's factory it was called Taylor's machine?

A. By the declaration of Mr. Cowperthwaite.

(It was understood between the counsel for the respective parties that the objections above entered should apply equally to all the questions and answers of this witness.)

The counsel for the defendants declines the cross-examination of the witness for the reasons stated in the objections above
86 entered.

ABEL F. BEARDSLEY.

Sworn to before me this 29th Sept., 1857.

R. E. STILWELL, *U. S. Com.*

The witness, Abel F. Beardsley, desires to correct his testimony as follows: that is, he wishes to say that it was one year ago last May, instead of "two years ago last May," when he left the employment of Mr. Hurlburt.

87 ABEL F. BEARDSLEY.

Sworn to before me this 29th day of Sept., 1857.

R. E. STILWELL, *U. S. Com.*

88 UNITED STATES OF AMERICA,
Southern District of New York, City,
County, and State of New York, ss.

Be it remembered, that on this 29th day of September, in the year of our Lord one thousand eight hundred and fifty-seven, I, R. E. Stilwell, a commissioner, duly appointed by the circuit court of the United States, for the southern district of New York,
89 in the second circuit, under and by virtue of the acts of

Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call
90 and cause to be and personally appear before me, at my office, in the city of New York, in the said southern district of New York, in the State aforesaid, Henry S. Beardsley, to testify and the truth to say, on the part and behalf of the complainants, in a certain suit or matter of controversy, now depending and undetermined, in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants.

91 And the said Henry S. Beardsley being about the age of sixteen years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said Henry S. Beardsley, and he did thereupon depose, testify, and say as follows, namely:

Q. 1. What is your name, age, residence, and occupation?

A. My name is Henry S. Beardsley; aged 16 years; reside in Danbury, in Connecticut, and am engaged in making tips for hats.

Q. 2. Do you remember a machine for making hats which
92 was operated in the Hurlburt factory by George E. Cowperthwaite?

A. I do.

Q. 3. When was it?

A. In the year 1855.

Q. 4. Do you know what became of that machine?

A. It was removed to "Shelter Rock factory."

93 Q. 5. Did you see it after it was removed to the Shelter Rock factory?

A. I did.

Q. 6. Did you work on said machine; and if so, at which of the two places?

A. At both places.

Q. 7. How do you fix the year in which this occurred?

A. Because I worked on the machine.

Q. 8. What have you been engaged in since you worked on the machine at the Shelter Rock factory?

94 A. Pointing tips.

Q. 9. How long have you worked at making tips?

A. About a year.

Q. 10. What did you do between the time you last worked on the machine at the Shelter Rock factory and the time when you commenced worked on tips?

A. Nothing; I went right at pointing tips when I left the Shelter Rock factory.

Q. 11. You have stated "that you stopped working on that machine in 1855. When you stopped on that machine you
95 immediately went to work making tips, and that you have been about a year making tips." How do you make out a period of over two years since you stopped working on the machine at the Shelter Rock factory?

A. I haven't worked all the while.

Q. 12. How long have you been out of work during that time?

A. I can't state the time exactly.

(It was understood that at the examination of this witness the defendants' counsel should have the right to enter an ob-
96 jection, and hereby does enter an objection to the testimony of this witness, upon the ground that it is irrelevant, and declines to cross-examine.)

HENRY S. BEARDSLEY.

Sworn to before me this 29th Sept., 1857.

R. E. STILWELL, *U. S. Com.*

The witness, Henry S. Beardsley, desires to correct his testimony as follows: in that part of his testimony in which he states
97 "that he remembers a machine in Hurlburt's factory, and when he says it was in the year 1855," he wishes to say it was in the year 1856, instead of the year 1855.

HENRY S. BEARDSLEY.

Sworn to before me this 29th Sept., 1857.

R. E. STILWELL, *U. S. Com.*

UNITED STATES OF AMERICA,

98 *Southern District of New York, City, County, and State of New York, ss.*

Be it remembered, that on this 29th day of September, in the year of our Lord one thousand eight hundred and fifty-seven, I, R. E. Stilwell, a commissioner, duly appointed by the circuit court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and
99 bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts

of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, in the city of New York, in the southern district of New York, in the State aforesaid, Stephen A. Hurlburt, to testify and the truth
100 to say, on the part and behalf of the complainants, in a certain suit or matter of controversy, now depending and undetermined, in the circuit court of the United States, for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants.

And the said Stephen A. Hurlburt, being about the age of fifty-five years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the
101 truth, in the matter of controversy aforesaid, I did carefully examine the said Stephen A. Hurlburt, and he did thereupon depose, testify, and say as follows, namely:

Q. 1. What is your name, age, residence, and occupation?

A. My name is Stephen A. Hurlburt; aged 55 years; reside in Danbury, Connecticut, and I am a fur-cutter and fur-blower.

Q. 2. Are you the owner of an establishment at Danbury known as Hurlburt's Factory?

102 A. I was, up to the 7th of January, 1857, when the factory was burnt. I was joint owner.

Q. 3. Have you any recollection of a machine for forming hat bodies in your establishment? If yea, state the circumstances under which it was brought and put up there.

(The counsel for the defendants objects to the question, and to all evidence of any matters occurring before the issue of the reissued patent on which this suit is brought; and this objection, by consent of plaintiffs' counsel, is applicable to all the ques-
103 tions to and answers of this witness.)

A. I recollect that a machine for forming hat bodies was set up there by Mr. Cowperthwaite, in the month of February, 1856, and remained there until about the middle of May, of the same year.

Q. 4. State who applied to you for permission to put up the said machine in your establishment. Give the name of the person or persons, and state fully what was said by such person or persons.

A. Mr. Cowperthwaite came first to examine the place and power at my place, with a view of getting a situation for driving this machine. He subsequently came in company with Mr. Taylor. Arrangements were made at that time, I think, that
104 they should try that machine there. Mr. Taylor remarked at that time that he—

(Defendants' counsel objects to anything that Mr. Taylor said)—

had doubts whether there was sufficient power to drive that ma-

chine. I then inquired of him how much power he thought the machine would take. He stated to me, "from 2 to 3 horse power." I then told him, if that was all, I thought we should be enabled to furnish him power, and had conversation with Mr. Cowperthwaite similar to that, but more extensive.

Q. 5. Did the said Taylor at this time express any desire that he should not be known as being connected with that ma-
105 chine? and if yea, state what he said on that subject.

(Objected to, in addition to the above, on the ground that the question calls for hearsay testimony.)

A. He stated that he didn't wish it to be known that he was there. That is about all the conversation I had with Mr. Taylor, including what I have said above about the power.

Q. 6. Was George E. Cowperthwaite present during the conversation to which you have referred above?

A. I should think he was.

106 *Cross-examined by Defendants' Counsel, subject to the ruling of the Court on the above objections.*

X 7. Who hired the premises of you for the machine to which you have referred in your direct examination?

A. Mr. Cowperthwaite.

STEPHEN A. HURLBURT.

Sworn to before me this 29th Sept., 1857.

R. E. STILWELL,

107 *U. S. Com.*

UNITED STATES OF AMERICA,
Southern District of New York,
City, County, and State of New York, ss.

Be it remembered, that on this 29th day of September, in the year of our Lord one thousand eight hundred and fifty-seven, I, Richard E. Stilwell, a commissioner duly appointed by the circuit court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of Con-
108 gress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office,
109 in the city of New York, in the said southern district of New York, in the State aforesaid, Harvey Waters, to testify and the truth to say, on the part and behalf of the complain-

ants in a certain suit or matter of controversy now depending and undetermined in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James B. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants.

And the said Harvey Waters being about the age of
110 fifty-three years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said Harvey Waters, and he did thereupon depose, testify, and say as follows, namely:

Q. 1. What is your name, age, residence, and occupation?

A. My name is Harvey Waters; age 53 years; reside in Northbridge, in the State of Massachusetts; and am a machinist.

Q. 2. State fully what have been your means for acquir-
111 ing knowledge of patented inventions, and of the distinction between formal and substantial charges in machinery?

A. I have been engaged as a machinist since I was 17 years old, as an apprentice, journeyman, and master, and am well acquainted with the theory of mechanics generally, and have made some inventions; and for the last ten years of my life, or twelve years, have been much engaged in the analysis of patented machines. During that time have been frequently called, as expert in patent causes, to testify as to the principles and mode of operation of said machines.

112 Q. 3. Have you examined the two reissues of a patent granted to Henry A. Wells on the 25th of April, 1846, "for an improvement in the machinery and process for the manufacture of hat bodies," which reissues were granted to Charles St. John, Henry A. Burr, Albert H. Wright, and James M. Riblet, as assignees of the said Henry A. Wells"—the one reissued on the 30th day of September, 1856, and the other on the 7th October, 1856? and if yea, state whether you understand the same.

113 A. I have examined those patents, and I think I understand them.

Q. 4. Will you state what, in your opinion, is the principle or mode of operation of the machinery for forming hat bodies, described in said reissued patent of Sept. 30th, 1856?

A. In general terms, the mode of operation consists in forming the bat of fur fibres by throwing the fur, in properly regulated quantities, against a section of the circumference of a perforated cone or other form, as the same is rotated, to present in
114 succession every part of the circumference thereof to the current of impelled fur, and thereby obtain the required thickness of bat, when this is combined with the holding of the fibres on to the cone during the operation by the pressure of the surrounding atmosphere, induced by exhausting the air from

within the said perforated cone or other form. To accomplish this in detail the following substantial parts are necessary, to wit: A feed-table, upon which the fur is distributed at will by the hand of the operator; a suitable feeding apparatus, to which the fur is
115 brought by the feed-table, and which presents and holds the fur to the action of a rotating brush or other suitable device for disintegrating and casting the fur into a current of air, induced by the rotating brush or other analogous device, which current of air assists in carrying forward this disintegrated and impelled fur, and depositing it upon a suitably perforated and exhausted cone, to be hereafter more fully described. There is also necessary to a suitable result a trunk, or some analogous device, by means of which the current of air bearing the fur shall be
116 so modified as to cast the fur upon a section of the cone, and also, in the same connection, a hinged hood, or some analogous device, by which the current of air may be further modified for the proper distribution of the fur upon the cone, in the direction of its length. The perforated cone must have a rotary motion, so as to present in its rotation its entire surface to the current of air bearing the impelled fur, and, moreover, must be provided with an exhaust, so that the atmospheric pressure shall produce a current through the perforated cone from the outside to
117 the inside, which current is induced by the exhaust, and is mainly for the purpose of holding the fur by atmospheric pressure upon the perforated cone when impelled and thrown upon it by the first current mentioned, which is induced by the disintegrating blowing apparatus. But this exhaust current is necessary to and serves partly in connection with the first current in inducing the fur to its desired position upon the perforated cone. The hinged hood in this apparatus is more particularly described in the patent as being automatic, and its purpose being to direct
118 the discharge and distribute the fibres on to the cone, a greater thickness being desirable in the parts of the bat which form the brim than on the tip and crown, &c. Instead of this automatic arrangement, I have seen used an analogous device, manipulated at will by the hand of the operator. This last alternative mode of operating the hinged hood or its equivalent is suggested in the patent.

Q. 5. Please state what, in your opinion, constitutes the principle or mode of operation of the invention described in the other reissued patent, dated October 7th, 1856.

A. In general terms, it consists in forming the bat of fur fibres
119 on a perforated cone or other form, in the manner substantially as above described—that is to say, with the feeding apparatus, disintegrating and blowing apparatus, trunk, and hood modifying the current, the rotating perforated exhausted cone, all operating substantially as in the first-mentioned patent,

in combination with the hardening of such bat, on such cone or other form, to give it the required consistency to admit of taking it off in a suitable condition for sizing, by the well-known process of felting. In detail and in construction of the process, after forming the bat on the cone, this invention is carried out
120 by covering it (the bat) with pieces of felt or fulled cloth just taken from hot water and wrapped about the fur upon the cone, and over this is slipped another perforated cone, all done while the fur is still upon the first cone, and under the atmospheric pressure, as first formed; the whole, that is, the cone upon which the bat is formed, the formed bat, the felt cloth, and the outer cone, are then removed from the exhaust, and if need be, another perforated metallic cone is put inside, and the whole immersed in hot water, to harden, so as it, the bat, may have
121 the required consistency to admit of taking it off in suitable condition for sizing or felting.

Q. 6. Please examine model, Exhibit A, on the part of the plaintiffs, and assuming it to be so modified that the cap represented on it is extended so as to cover the upper part of the upper picker-roller, and the cone, when placed in position to receive the fur from the pickers, is proportionably nearer to the pickers than is represented in that model, and state whether, in your opinion, a machine represented by said model would be substantially
122 like or substantially different, in principle or mode of operation, from the machine described in the before-named reissued patent, dated Sept. 30th, 1856, and assuming also that the fur is fed on the feed-apron of said machine by the hand of the operator in greater thickness on that side of the apron corresponding in line with the base of the cone, and gradually thinner towards the other side of the apron.

A. I think that a machine constructed as represented in this model, and modified as represented in the question, and fed as there assumed, would be substantially the same in princi-
123 ple, or mode of operation, as the machine described in the before named reissued patent, Sept. 30, 1856, because it would form a bat of fur fibres by throwing the fur in properly regulated quantities against a section of the circumference of a perforated cone, as the same is rotated to present every part of the circumference thereof, to the current of impelled fur, and thereby obtain the required thickness of bat, in combination with holding the fibres on to the cone during the operation, by the pressure of the surrounding atmosphere, induced by exhausting the
124 air from within the said perforated cone. In detail, it has the feeding-apron, the feeding-rolls, the disintegrating and blowing apparatus of the Wells contrivance, substantially. It has not, specifically, a guiding trunk of considerable length as in the Wells contrivance; but it has an equivalent therefor, and in con-

nection with the short sides of the trunk a secondary blowing cylinder as an adjunct to the disintegrating cylinder, and the short sides before mentioned, for modifying the fur-bearing current of air, and guiding it, the fur, as it is impelled by the disintegrating picker, upon or against a section of the circumfer-
125 ence of the perforated cone. The cone is exhausted and rotated substantially as in the Wells contrivance, and for the same purpose or purposes, and is placed in front of the delivering aperture as in the Wells contrivance, substantially. This machine is not provided specifically with a hinged hood, as is the Wells machine, nor do I understand that the operator or operation modifies the current of air bearing the fur, by any specific device answering to the hinged hood. But I understand that the variable thickness of the bat, in the direction of the length of the
126 cone, is made equivalent thereto at the will of the operative, by feeding the fur upon the apron of the machine in a greater quantity over against those parts where greater fur is desired upon the cone in the direction of its length.

Q. 7. I perceive that in the Wells machine, as described in the before named reissued patent, the axis of the perforated cone on which the bat is formed is placed at right angles to the axis of the picker, and in model Exhibit A, the axis of the cone is placed in a line nearly parallel with the axis of the picker. Does
127 that constitute a substantial difference in the principle or mode of operation of the two machines; and if not, why?

A. I think it does not, because the Wells machine will operate just as well if the axis of the cone was parallel to the axis of the picker, or disintegrating fan. But this parallelism of the picker with the axis of the cone in the model is necessary, in order that the unequal feed upon the apron shall compensate for the modification of the fur-bearing current of air by means of the trunk and hood between the fan brush, and the cone in the Wells con-
128 trivance.

Q. 8. If the axis of the cone in the Wells machine was changed from the position of right angles to the axis of the picker, and placed parallel to said picker, what, if any, modification would be required in the intermediate parts between the cone and picker?

A. It would be required to modify the guiding trunk by taking the twist out of it—that is to say, instead of having the delivery orifice longest, in a line at right angles to the picking and blowing apparatus, it should be longest in a line parallel with
129 the picking and blowing apparatus, and by that change a trunk, very much shorter than that described in the Wells contrivance, would answer the purpose.

Q. 9. Would such change, described in your last answer, be formal or substantial?

A. Merely formal.

Q. 10. In case of such modification as specified in the last answer but one, could the required distribution of fur to give the required varying thickness of fur in the direction of the length
130 of the cone be obtained without the use of the hood; and if so, by what means?

A. It could be obtained, without the use of the hood, by feeding the fur upon the machine thicker or thinner upon those parts, over against which the deposits upon the cone, in the direction of its length, are required to be thicker or thinner to form a good bat.

Q. 11. Assuming that in working a machine made in accordance with model Exhibit A, on the part of the plaintiffs,
131 after the required thickness of bat has been formed on a cone, another perforated cone of slightly larger diameter is placed over such bat, and the cone-case stand moved around about one third the circumference of the stand, and brought under a set of rollers which bear upon the upper part of the outer cone, to make a portion of its inner circumference bear upon the bat, and a button on the tip of the outer cone, put in connection with an arm and a longitudinal jiggering or vibratory motion given to the rollers and arm, and by them to the outer cone, whilst the cones and bat are slowly rotated on their axis to partially harden
132 the bat, whilst the pressure of the atmosphere is retained upon the bat by having the inside of the inner cone maintained in connection with the exhausting fan. Would such mode of procedure be substantially like, or substantially different from the invention described in the before named reissued patent, dated October 7, 1856, as the same has been defined by you in your testimony?

A. Such mode of procedure would, in my judgment, be substantially like the invention described in the forenamed re-
133 issued patent of October 7, 1856, because the bat is formed on the exhausted perforated cone, and there held substantially in the same manner as in the Wells patent, and in combination therewith, the hardening of the bat while on such cone, to give it the required consistency, is effected substantially in the same way as in the Wells process. It is true that in the Wells process there is a felt cloth, one or more, used upon the bat, and between the bat and the outer cone, to hold the fur upon the inner cone when taken from the exhaust to be hardened by plung-
134 ing in and withdrawing from the hot water, for the purpose of hardening the bat. While in the model the process is by felting by means of the jiggering motion of the outer cone upon the bat, thus to some extent interlocking the fibres by working them together while under the pressure of the atmosphere. But I understand that hardening by the wet process and by the dry process, per se, were both well known modes.

Adjourned till to-morrow morning at 9 a. m.

135 WEDNESDAY, *September* 30, 1857.

Q. 12. Have you examined a certified copy of letters-patent granted to Alva B. Taylor for improvement in machinery for forming hat bodies, dated July 29, 1856? and if yea, state how the picking apparatus, represented on model A, on the part of the plaintiffs, corresponds with the picking apparatus described in the said patent.

A. I have examined that patent. The picking apparatus there described corresponds with that in the model, with this ex-
136 ception: the patent provides that the machine should be so constructed that the upper picker-roller shall be adjustable about the axis of the lower roller, so as to vary the inclination of the tangent common to the two rollers.

Q. 13. Are the descriptions in the two reissued patents to St. John and others, of September 30 and October 7, 1856, sufficiently full and clear to enable a competent person to construct and operate a machine, and work the process named in the said patents?

A. Yes.

137 Q. 14. Please examine the model marked "Exhibit E, H. A. Wells," and state whether the same is constructed according to the description in the reissued patent of St. John and others of September 30th, 1856.

A. It is.

Q. 15. Will you examine letters-patent granted to A. B. Taylor and H. A. Burr, for improvement in machinery for making hat bodies, dated 9th day of February, 1847, and examine model marked "Exhibit B, J. W. N., U. S. Commissioner," and
138 state what means are provided in said patent and model for effecting the distribution of the fur as deposited on the cone to vary the thickness required from the brim to the tip, when such varying thickness is required to be changed?

A. In that patent and model, the variable thickness of the bat in the direction of the length of the cone is accomplished by constructing the guiding trunk in such manner and of such material as that the delivery aperture of the trunk may be varied at pleasure, both in size and form, thereby modulating the current bearing the
139 fur, as the necessities of the case may require. This modification is effected by the hand of the operator, from time to time, as the different form and proportion of bats require it.

Q. 16. In your judgment, would a machine constructed and operated according to the said patent of A. B. Taylor and H. A. Burr, and the model Exhibit B, involve the principle or mode of operation described in the reissued patent to St. John and others, of September 30, 1856, as the same has been defined by you, or be substantially different therefrom?

140 A. Such a machine would involve the same substantial mode of operation as a machine constructed in accordance with

the Wells patent originally reissued, as your question contemplates.

Cross-examined by Mr. Gifford, counsel for the complainant.

X 17. In your direct examination, you give your opinion as to what is the principle or mode of operation of the machinery for forming hat bodies described in the reissued patent of the 30th September, 1856, in what you call general terms. Do you
141 mean that the mode and operation is anything different in particular terms from what it is in general terms?

A. No, not different, except that it is more specific in particular terms.

X 18. Then you give it as your opinion, that the principle or mode of operation of that machinery is more specific in particular terms than it is in general terms, do you?

A. Not exactly that; I mean that the description of the
142 mode of operation is more specific in particular than in general terms.

X 19. Then your answer on that subject refers to words of description, do they not?

A. No, not per se, but to the substance of the description.

X 20. But have you not said that the difference between a description in general terms and a description in particular terms refers to the means of describing only?

A. No, I think not, but more particularly to the mode of
143 describing.

X 21. In the use of the Wells machine, in what condition is the fur when it has proceeded, say six inches from the picker?

A. It is in the condition of progress from the disintegrating and blowing apparatus to the cone, moving partly by the impulse given to it mechanically by the motion of the brush, and partly borne and guided by the current of air generated by the rotation of the brush.

X 22. Is the fur then and there in regulated quantities?
144 Not fully.

X 23. Question repeated.

A. No; I will explain.

(Question being fully answered, any volunteer on the part of the witness objected to.)

The patent speaks of throwing the fur in properly regulated quantities upon a section of the circumference of the perforated cone, and, as necessary to this result, the fur is to be fed upon the feed-table of the machine, by the hand of the operative,
145 and for the proper operation of the machine it should be fed upon the table, as near even as may be. In that respect the quantity is regulated, but in all that goes substantially to the distribution of the fur upon the cone, to give the variable thickness

to the brim and tip, that is mainly accomplished beyond the point of six inches distance from the picking and blowing apparatus.

X 24. According to your best comprehension, do you consider that all the statement you have made under the 23d question was responsive to that question?

A. I believe so. The explanation being necessary, in my
146 judgment, to prevent misapprehension of the meaning of the answer.

X 25. Do you mean to be understood as saying that to secure a proper operation of the Wells machine, the fur must be fed evenly upon the feed-table?

A. Yes; I mean that the operation will be better when so fed.

X 26. Have you found anything in the Wells patent giving such directions? and if you have, quote the language therefrom in your answer; and if you have not, please say so.

147 A. I don't remember any specific directions to that effect in the Wells patent.

X 27. Do you remember of any such implied direction? and if you do, please quote in your answer the language by which it is implied.

A. The patent says, "the stock is spread by the attendant in separate parcels, each sufficient for the formation of a bat, according to its intended weight, upon the lower feed-apron of the machine," and then goes on to describe how the fur is taken
148 from the apron and held in a gripe to the effective action of a brush. Now it is clear to any practical mind that the process will be better carried on when such presentation and griping is uniform and continuous in the process of forming a bat, and when the feed-apron in its motion is uniform and continuous; the presentation can only be continuous when the fur is evenly fed and distributed on the feed-table of the machine.

(Defendants' counsel objects to all of that statement of the witness under the 27th question, which is not responsive to that question, and asks:)

149 X 28. Have you now quoted from the patent sufficient in your judgment, and so far as you can find anything herein to fully answer the 26th and 27th interrogatories?

A. I think so.

X 29. Have you supposed that the words of the patent which you have quoted, contain any direct or implied direction to put the fur, or spread the fur evenly, upon the feed-table or feed-apron? Please answer the question directly.

A. No, as a mere matter of words.

150 (Here the defendants' counsel objects to any volunteer.)

X 30. Do you find anything in the drawing of the patent contradictory of those words?

A. No.

X 31. In the operation of the Wells machine, when the fur has proceeded, say six inches from the picker, what has then been done to the fur in that operation?

A. It has been disintegrated by the action of the brush, and thrown out from the feed-rollers into a current of air (gene-
151 rated by the brush) on its way to its desired position upon the cone.

X 32. Is the fur between the last mentioned point and the cone regulated so as to secure the formation of a bat which will make a hat thickest at the brim, and taper and become thinner towards and at the tip, in the operation of the Wells machine?

A. Mainly, yes. It is difficult to say at what precise point in its progress from the rolls to the cone the current of air and fur commences its modulation. It takes place somewhere be-
152 tween the rolls and the cone, and mainly beyond the point of six inches from the blower.

X 33. What do you mean by "modulation of the current of air and fur" in your last answer?

A. I mean the modulation due to the sides of the guiding trunk, the delivery aperture of the trunk, and the hinged hood, with some further modulation due to the current of air generated by the exhaust of the cone, said last current of air blending with the first current in the immediate neighborhood of the exhausted cone only.

X 34. In the operation of the Wells machine, if you take
153 away the trunk, leaving all other parts unchanged, would the fur be deposited on the cone in regular quantities?

A. No.

X 35. In your direct examination you have spoken of throwing the fur against the cone. What do you mean by "throwing against" in that connection?

A. I mean against, or on, or upon.

X 36. Suppose the fur were thrown in an upward direction, so as to drop by gravity upon the cone, the cone remaining
154 in the position shown in the Wells patent; would that be within what you mean by "throwing it against, or upon," the cone?

A. No.

X 37. Suppose that an inclined board, or other surface, to be placed a little beyond and above the cone, and a trunk or conductor be elevated above the cone, so as to direct the fur against such inclined surface, and have it reflected thereby upon the cone, the cone at the same time remaining in the position as shown in the Wells patent; would that be within what you mean by
155 throwing the fur against or upon the cone?

A. Yes, I believe so, provided the parts were properly positioned, and the deflecting angle suitable.

X 38. By what agencies would such throwing against or upon the cone be accomplished in the case last mentioned?

A. The picking and blowing cylinder, or brush, the guiding trunk, hinged hood, and deflector, the currents of air generated by the fan-brush, and the exhaust within the cone assisting thereunto.

156 X 39. Suppose in the case last stated a current of air be substituted in place of the inclined board, to reflect the fur back and down upon the cone; would that be within what you mean by throwing it against or upon the cone?

A. If I understand the proposition, yes.

X 40. In that case the direction of the fur would be changed after leaving the picker, and before its deposit upon the cone, would it not?

A. Certainly.

157 X 41. Suppose the trunk and cone in the Wells machine be so relatively placed that the fur, on leaving the aperture of the trunk, would be directed above or towards the tip of the cone, and sufficient attractive force were brought in action upon the current of fur, so as to secure its deposition exclusively upon the cone near its base; would that be within what you mean by throwing the fur against or upon the cone?

A. No.

158 X 42. Suppose that in the last stated case the attractive force downward and upon the current of fur was sufficient to bring the fur down upon the cone, so as to cover the entire cone; would that be within what you mean by throwing the fur against and upon the cone?

A. No. I will state here—

(Again objected to volunteer answers.)

that in both the last mentioned propositions the state of things would be such that no rotation of the cone would be necessary to the result, because the fur would gravitate upon the entire cone uniformly in the direction of its circumference. This would

159 not be true in the last proposition but one, perhaps, but as I understand it, it would be true in the last proposition. In all these hypothetic machines it is difficult to answer categorically in consequence of misappropriating the exact construction contemplated in the question.

X 43. Suppose the fur were so drawn down by the attractive force, as to come against the cone chiefly upon one side of it, the cone at the same time rotating; would that be within what you mean by throwing the fur against or upon the cone?

160 A. If I understand your hypothesis, yes.

X 44. In your direct examination in reference to the fur,

you have used the phrase "properly regulated quantities." In what sense, or with what intended meaning, do you thus employ the word "properly?"

A. That refers mostly to controlling the deposit in the direction of the length of the cone, because the regulation in the other direction will be insured by the rotation of the cone, provided the fur be evenly fed upon the table of the machine.

161 X 45. If the fur is regulated, and is not properly regulated, does it not follow, according to your understanding of language, that it is improperly regulated?

A. I suppose so.

X 46. How is it to be determined whether the fur is properly or improperly regulated in the formation of the bat?

A. By the bat itself as the best means.

X 47. What must be the form or condition of the bat to show that the fur was properly regulated?

162 A. Uniform in thickness in going around the cone in its circumference, and variable in the direction of its length.

X 48. If the bat be formed without being uniform in thickness around the cone, and without being variable in the direction of the length of the cone, would that show, in your judgment, that the fur had been improperly regulated?

A. Yes.

X 49. Do you mean to be understood that the properly regulating the fur is an essential feature in the operation of the Wells machine?

163 A. Yes.

X 50. If one were to employ Wells' machine, including trunk and all, as he has described it, to form bats for hat bodies, except such an alteration in the form of the delivery aperture of the trunk as to deposit the fur upon the cone in uniform thickness in the direction of the length of the cone, would that be an employment of what you understand to be set forth in said reissued patents as an invention of Wells?

A. Yes, because it would still be Wells' machine, having the capacity to vary the thickness in the direction of the length
164 of the cone, if the operator chose to so use it.

X 51. What form do you understand would be the delivery aperture of the trunk to deposit the fur as specified in the last question?

A. I don't know what form.

X 52. Do you know what form would deposit the fur thicker towards the tip than towards the base of the cone?

A. A parallelogram would probably.

X 53. Would it not do so if you were to make the de-
165 livery aperture of the trunk wider at the top than at the bottom?

A. It would, everything else being the same as in the Wells machine, as specifically described in the patent.

X 54. By your previous answers do you mean to be understood as meaning that the employment of such machines would use what is set forth in said patents as an invention of Wells?

(Objected to, as the question does not specify what answer.)

166 A. Yes; meaning to be understood that if the machine be built in accordance with the description in Wells' patent, except that the constructor chose to make the delivery orifice bigger at the top than at the bottom, it would still be substantially the same in principle and mode of operation as it would be if the delivery aperture were bigger at the bottom than at the top, as described in the patent.

X 55. In a machine as last specified would the fur be properly regulated by the machine?

167 A. In one sense it would, because it would be regulated at the will of the operator. In another sense it would not, because it would be regulated so as to make a bad hat.

X 56. In that case, and in that sense, when you say "it would be regulated by the will of the operator," would the operator or the machine regulate it?

A. Both, because the operator regulates the orifice to the desired end, and when so regulated the machine controls a deposit of fur.

X 57. Then is it not also true that where a man constructs a machine, which regulates a given operation, that such operation is regulated by both the man and the machine?

168 A. Yes; I have said so above.

X 58. In case the trunk and aperture be made of rigid materials, (such as boards,) how then would the will of the operator regulate the fur?

A. Stop up the orifice so as to make it narrow at the bottom by any means he chooses—nail a bit of cloth across, or a bit of leather, or stick a board inside, and he may, without any invention,

169 construct an entire new trunk with such an orifice as he chooses.

X 59. Could not the operator as easily do those things if the delivery aperture of the trunk was in the form of a parallelogram?

A. Yes, when he understood the Wells machine.

X 60. Do you mean that he couldn't stick a board in, or a cloth over, a part of the aperture, as you have mentioned, without understanding the Wells machine?

A. No; I only mean that it would be necessary to have the Wells machine, and understand its mode of operation, in

170 order to make such modification intelligently and without invention.

X 61. Do you mean that it would be necessary for him to understand the form of the delivery aperture of the Wells trunk; and

if not, what other part of the Wells machine would it be necessary for him to understand to enable his will to make the right kind of delivery aperture?

A. I do mean that it would be necessary to understand the effect of changing the form of the delivery aperture in the Wells machine, taken as a whole.

171 (Answer objected to, as not responsive to the question, and the question is repeated.)

A. 62. If I have not answered your question I have misapprehended it, and must beg of you to be kind enough to be more explicit.

X 63. Do you not know that the 61st question refers specifically to the form of the delivery aperture, and not to what you call "the effct of changing the form," taken as a whole?

A. No, I do not; I have not spoken of the form taken as
172 a whole, but of the form of the aperture in the Wells machine, taken as a whole.

X 64. Do you not know that that question, No. 61, refers to the form of the delivery aperture specifically?

A. I suppose it does, and I suppose that the question means to ask whether it would be necessary to know anything more than the specific form described in that machine to make the alterations intelligently.

X 65. Do you mean to say that you find anything in that 61st question to support the last supposition which you have
173 volunteered as an answer to the 64th question, in which I ask you for knowledge?

A. I am not conscious of having volunteered anything beyond a fair answer to the 64th question. It might be more proper to say, I understand that the question means to ask, in place of "I suppose that the question means to ask," etc.

X 66. Do you now believe that you have answered the last question?

A. I do.

174 X 67. During the progress of your testimony you have several times spoken of the "operator" or "operative regulating the fur at will," and have also said "that he could do that by changing the form of the delivery aperture of a trunk by stopping up a portion of such aperture, or by making an entirely new trunk," and have given the idea that to do that such operator or operative must be acquainted with the Wells machine. Would it be necessary in your opinion that he should be acquainted with the Wells form of the delivery aperture; and if not, then what
175 other part of the Wells machine would he have to be acquainted with to enable him to make the alterations at will as you have specified? This question refers and is intended to refer to a part or parts of the machine.

A. It would be necessary that he should be acquainted with the form of the delivery aperture described in the Wells patent, and more than that.

(Question being answered, counsel for the defendant objects to any further statement of the witness as not responsive.)

176 X 68. In your direct examination you employed the words "section of a cone." What part of a cone do you mean by the word section?

A. Any part less than a whole in the direction of the circumference.

X 69. If the fur be deposited on all sides of the cone at the same time, would that be within your meaning, where you have spoken in this deposition of its being deposited upon a section of a cone?

A. It might be, and would be, if the deposit were mainly

177 upon one side, and very slight upon the other side.

X 70. What would have to be the relative amount of deposit upon the respective sides to bring it within your meaning of depositing upon a section?

A. I can't say exactly. It would certainly be more than half, if there were but one delivery aperture.

X 71. Do you understand that anything has been said in this deposition about a machine or trunk with more than one delivery aperture?

A. No; but the Wells machine has been made, to my

178 knowledge, with two delivery apertures.

(The statement of the witness, after the answer "No," is objected to by defendants' counsel as a volunteer, and not responsive to the question.)

X 72. You say, in answer to the 70th interrogatory, that you "cannot say exactly what would have to be the relative amount of deposit of fur upon the respective sides of the cone to bring it within your meaning of depositing upon a section." Do you know or believe that anybody knows that exactly?

179 A. No.

X 73. You say, however, that it would certainly be more than half. Suppose in one case four-sixths of the fur to be deposited upon one-half of the cone, while at the same time two-sixths be deposited upon the other half. According to your theory and judgment, would both, or either, and which of those instances, be depositing the fur upon a section of that cone?

A. Will you be kind enough to explain what you mean by "those instances"?

180 X 74. I mean where in one case four-sixths of the fur is deposited upon one-half of the revolving cone, or a revolving cone, and the remaining two-sixths at the same time is deposited upon the other half of the revolving cone.

A. I should think so, the deposit being accomplished by substantially the same means as in the Wells machine.

X 75. Then you mean to say, do you, or to insinuate, that when deposited by substantially the same means as in the Wells machine, in the instances I have put, it would be within your mean-
181 ing of depositing upon a section; but if deposited as the question states, by substantially different means from the Wells machine, that then it would not be within your meaning of depositing upon a section.

A. Yes.

X 76. In answer to the 6th direct interrogatory you have said, "that you think a machine constructed as represented in the model therein referred to," modified as represented in the question, and fed as there assumed, would be substantially the same in principle or mode of operation as the machine described in the before
182 named reissued patent of September 30, 1856. In case you leave out of that question the assumptions, or any of them, made in the answer, would or would not your answer be the same?

A. I think a machine constructed as represented by this model without the assumed alterations, and fed as assumed in the 6th direct interrogatory, heavier over against that part of the cone where the bat was required to be thicker, would be substantially the same in principle and mode of operation as a machine built in accordance with the description in Wells' patent. But I
183 doubt whether the use of such machine—

(Counsel for the defendants objects to any statement of the witness not responsive to the question, and defendants' counsel also objects to any statements of doubts or arguments of the witness as being not responsive to the question, and needlessly protracting the examination.)

—without practising the feed as aforesaid, could be said to be substantially the same in principle and mode of operation as the Wells machine, and indeed I do not think it would.

184 X 77. Suppose a machine to be constructed substantially the same as the model referred to in the 6th direct interrogatory, as being marked Exhibit A, without the alterations assumed in that interrogatory, and without any fur ever being fed to or into the machine: do you mean to say that such machine would be substantially the same in principle and mode of operation as the machine described in the reissued patent of Sept. 30, 1856?

A. No.

X 78. In the machine referred to in the last question,
185 suppose, instead of fur never being fed into it, it should be operated only by the fur being laid only upon that side of the apron opposite to the tip of the cone; would such a machine with such feeding, in your judgment, be substantially the same in principle or mode of operation, as the machine described in the reissued patent of September 30, 1856?

A. I think not.

X 79. Suppose such a machine as last referred to be twice used, and only twice used, and in one case of such use the boy
186 laying the fur on the apron willed to lay it, and did lay it on that side of the apron opposite the tip of the cone, and in the other case the boy feeding willed to lay the fur, and did so lay it on that side of the apron opposite to the base or larger end of the cone; do you think that in either of the cases of such use the machine would be substantially the same in principle or mode of operation as the machine described in the last mentioned reissued patent?

A. Not necessarily.

X 80. Is it, although not necessarily?

187 A. It may or it may not be. It will depend upon the manner and purpose of feeding upon one side—that is, upon the side opposite the big end of the cone; for when fed upon the other side—that is, opposite the small end of the cone—it certainly could not come up to the same mode of operation; if the machine was so fed upon the right side as to give the proper form of bat intelligently and purposely, it would in my opinion be practising substantially the mode of operation described in the Wells patent. But if done hap-hazard, it would not be practising the invention.

188 X 81. I have put in the last questions two distinct cases to you. Have you made all the answer to that question you have to make?

A. I believe so.

X 82. What would the feeding boy have to do to perform a hap-hazard act, which you have mentioned in your answer to the 80th question?

A. He would have to feed the fur with no other purpose in his mind than merely to place it upon one side of the machine, instead of the other side of the machine.

189 X 83. Suppose a man constructs such a machine, and does nothing more with it, a boy lays fur on the apron with the view of forming a good bat for a hat body on the cone, and nothing more, and a third individual starts the machine with the view only of getting the fur out of the way that is on it, and the result is that a bat is formed on the cone of uniform thickness around the cone, and a variable thickness in the direction of the length of the cone, being thinner at the tip than at the base; would any of those three individuals, and if so, which of them, do anything that
190 would come substantially within the same principle or mode of operation as the machine described in the reissued patents of September 30, 1856?

A. This strikes me as a legal question, or rather a question requiring a legal answer. I think that the mere construction of the

machine of the first-named individual would not be practising the invention; also, that the mere feeding of the fur upon the apron of such a machine, would not be practising the invention. Nor do I think that a person starting the machine, when so fed,
191 merely to run out the fur, could be said to be practising the invention. It is clear enough that the whole together would in fact practise the invention of Wells.

(Adjourned from half-past four to half-past six o'clock.)

X 84. In answer to the 11th direct interrogatory, among other things you say, "the hardening of the bat by jiggering while on the cone, as described in that question, to give it the required consistency, is effected substantially in the same way as in the Wells process." Will you explain what you there mean by the hardening being effected substantially in the same way as in the
192 Wells process?

A. What I mean is that the bat is hardened on the cone by interlocking the fibres; in one case by agitating them under pressure, thus interlocking them sufficiently to give the bat the required consistency for removal from the cone, the process being facilitated by the heat imparted from the hot water; and in the other case, the particles being interlocked by agitating them under pressure while on said cone in the dry way, in
193 order to give the required consistency to the bat before its removal from the cone. Now, inasmuch as the wet method and the dry method were both well known and understood per se—that is, when performed independent of the cone upon which they were formed—it appears to me that the mere substitution of one mode of interlocking—that is, the dry mode instead of the wet mode—and the mere substitution of agitating by a jiggering motion applied to the outer cone in place of agitating by plunging in hot water and withdrawing therefrom, thus agitating the fibres of fur by inducing currents of water through them to interlock
194 them, does not change substantially the process.

X 85. Is that the best explanation you can give to justify your statement, that the two hardenings are effected substantially in the same way?

A. I believe so.

X 86. What sameness of way do you intend to show by your answer to the 84th question? Is it a sameness in the fact of interlocking fibres, or what do you mean?

A. It is not a sameness in the fact of interlocking fibres merely, but in the sameness of interlocking them while on the cone
195 upon which the bat is formed preparatory to its being removed therefrom by one well known mode of operation, instead of another well known mode, using the accessory outer covering in both cases.

X 87. Then do you mean to be understood, that what you un-

A. I think not.

X 79. Suppose such a machine as last referred to be twice used, and only twice used, and in one case of such use the boy
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A. Not necessarily.

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190 would come substantially within the same principle or mode of operation as the machine described in the reissued patents of September 30, 1856?

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192 Wells process?

A. What I mean is that the bat is hardened on the cone by interlocking the fibres; in one case by agitating them under pressure, thus interlocking them sufficiently to give the bat the required consistency for removal from the cone, the process being facilitated by the heat imparted from the hot water; and in the other case, the particles being interlocked by agitating them under pressure while on said cone in the dry way, in
193 order to give the required consistency to the bat before its removal from the cone. Now, inasmuch as the wet method and the dry method were both well known and understood per se—that is, when performed independent of the cone upon which they were formed—it appears to me that the mere substitution of one mode of interlocking—that is, the dry mode instead of the wet mode—and the mere substitution of agitating by a jiggering motion applied to the outer cone in place of agitating by plunging in hot water and withdrawing therefrom, thus agitating the fibres of fur by inducing currents of water through them to interlock
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A. It is not a sameness in the fact of interlocking fibres merely, but in the sameness of interlocking them while on the cone
195 upon which the bat is formed preparatory to its being removed therefrom by one well known mode of operation, instead of another well known mode, using the accessory outer covering in both cases.

X 87. Then do you mean to be understood, that what you un-

derstand by the process of hardening in the Wells patent, and as set forth in the 11th direct interrogatory, consists only of interlocking the fibres of fur in each case while the bat is on the cone?

196 A. No.

X 88. Will you then answer what you wish to be understood as supposing or meaning the process of hardening to consist of, as described in the Wells patent?

A. The Wells patent does not describe the hardening as a process, nor speak of it as a process, but it speaks of the process of forming hat bodies, or making hat bodies, by forming the bat of fur fibres on a perforated cone in manner substantially described, in combination with the hardening of such bat while on such cone,

197 to give it the required consistency, substantially as described.

X 89. Will you now state, if you can, what are the things or several successive steps which the Wells reissued patent of October 7th, 1856, directs to be done to or with the bat after the fur has been deposited upon the cone to form the bat, to remove it from such cone?

A. It is necessary, in order to follow the directions of the patent, to wrap about the fur bat pieces of felt, or fulled cloth, just taken from hot water, and then to place over this felt a perforated

198 metallic cone; then to remove the two cones with the bat and cloth between them, held there under slight pressue, and immerse the whole in hot water; it will then be necessary to take off the outer cone and the felt.

X 90. Haven't you overlooked the fact that two pieces of cloth are put upon the bat before the confinement of the cloth to the bat by an outer cone?

A. No.

X 91. Is the process or operation which you have described in your answer to the 89th question, a process of hardening

199 the bat, or a process of removing it from the cone, or a process of preparing the bat to be removed from the cone?

A. A process of preparing the bat to be removed from the cone.

X 92. Do you find in the manner and operation of preparing the bat, as set forth in the 11th direct question, by what you have called the dry method, any of the steps or things which you have set forth as the process of preparing to remove from the cone in your answer to the 89th interrogatory?

200 A. Specifically only the placing of the outer cone over the fur bat while under pressure.

X 93. Do you know what is the object of putting an outer cone over the bat covered with wet cloth, as described in the Wells patent?

A. The object is to harden the bat. The specific purpose is the more effectually to hold the fibres of the bat, and to make a slight

pressure on them, while removing the whole from the machine, (by which the pressure of the atmosphere is taken from the bat,) and immersing it in hot water.

201 X 94. Does not the patent state the object of that outer cone to be to hold the fibres of the bat, and to make a slight pressure on them while it is immersed in hot water to harden?

A. The patent does state that the purpose of that outer cone is more effectually "to hold the fibres of the bat, and to make a slight pressure on them while it is immersed in hot water to harden."

X 95. In your answer to the 93d interrogatory you mentioned "that by removing the cone with the bat on it from the ma-

202 chine, the pressure of the atmosphere upon the bat is taken off;" does that render the outer cone or cover necessary or important?

A. I think so.

X 96. Suppose you were to remove the cone with the bat on it from the machine, without any cloth or other cover on it to hold it, and immerse it in hot water to harden the bat; what, according to the best of your judgment, would be the effect?

A. I think the effect would be injurious to the bat.

203 X 97. In what way and at what stage of the proceeding would such injury befall the bat?

A. I think it would commence on the removal from the exhaust, and end with the immersion in hot water.

X 98. What do you think would be the first appearance of the commencement of such injury, and to what extent would it have attained, on taking the bat out of hot water?

A. I think the first appearance would be a bristling up of the fibres of the fur, and partial opening of the bat, and that afterwards in immersing in hot water there would be great

204 danger of a mechanical disturbance of the fabric found at that stage of the process.

X 99. What did you suppose the jiggering cone to be used for in the dry process of preparing a bat to be removed from the cone, referred to in the 11th direct interrogatory?

A. As an accessory means of agitating the fur, and producing greater pressure upon it while under such agitation.

X 100. Pressure where, upon the bat, at any given time?

A. In the neighborhood of the pressure-rollers.

X 101. What pressure-rollers do you mean?

205 A. I mean the rollers that press upon the outer cone.

X 102. At the time you answered the 11th direct interrogatory, was you aware how much larger the jiggering cone was to be than the bat which it covers, or how much larger did you assume it to be, if any?

A. I don't remember. I know now, and I knew then, that in order to perfect the process properly, it must be enough larger to

allow of its being slid over or upon the bat without disturbing the texture of it.

X 103. In preparing a bat to be removed from the cone,
206 by the Wells process described in the patent, how many applications of water do you find?

A. Specifically and strictly, two.

X 104. Do you know what is the object and effect of the application of water in that process?

A. To harden the bat effectually.

X 105. In your answer to the 4th direct question you say in reference to the mode of operation of Wells', "that the fur thrown against a section of the circumference of a perforated cone
207 or other form;" how came you to employ the words "other form?"

A. My impression is, it was because the patent so specifies.

X 106. Do you know what those words mean, then? and if you do, or think you do, explain.

A. Where?

X 107. In your own answer to the 4th direct question.

A. Any form substantially the same as a cone—that is, a form cylindrical with a conical end, or a form conical in its section when cut through the axis, but oval in its section when cut through at right angles to its axis; these are two specimens of forms
208 specifically different, but substantially the same. Various other forms there may be, answering the same conditions. These two I now think of.

X 108. Do you find any limitation in the specification of the patent of the meaning of the words "other form," to what you have set forth in your last answer? and if you do, quote the words from the patent in your answer, expressing or implying such limitation.

A. In specific terms, no.

209 X 109. Well, in any terms, specific or non-specific?

A. The process of forming fur hat bodies substantially, as in the Wells machine, could not, in my judgment, be carried out unless the exhausted frame upon which the bat is formed was substantially a cone. Therefore, in speaking of this contrivance, and in describing the contrivance for its purpose, I consider it a fair assumption that the form of this auxiliary, to wit, the revolving perforated cone, is contemplated to be such as would answer its purpose in the contrivance.

210 (Defendants' counsel objects to that answer as not responsive, and the question is repeated.)

A. 110. I don't think I can answer that question any better.

X 111. Do you understand the specification or description of the patent to limit the formation of bats, to those which are to be used for hat bodies?

A. Yes, and analogous forms.

X 112. What do you mean by "analogous forms" in your last answer; analogous to what?

211 A. Analogous to a hat body formed of fur fibres, or other analogous material.

X 113. Analogous in what quality or property would any other form that you refer to be to a hat body?

A. In the property of being substantially conical in its general form; uniform in thickness in the direction of its circumference, and variable in thickness in the direction of its length.

X 114. Why would not, by your same notion or theory, a cylindrical form of bat be analogous?

212 A. Because it might be cylindrical in form and be open at both ends.

X 115. Would it not be substantially of a conical form, and be open at both ends?

A. No.

X 116. If being open at both ends prevents the cylindrical form of the bat coming within your notion of an analogous form, how would it be in case you were to stop up, or cover, or form the bat across one end of the cylindrical form?

213 A. If by stopping up, or covering, or forming the bat across one end, you mean employing a perforated cone of such shape so as to deposit the fur upon the whole surface, such employment would, in my opinion, be substantially the same as employing the perforated cone.

X 117. Do you know how the end of a cylindrical-formed bat could be covered by the bat being formed across it, or a cylindrical-formed bat could be made by the instrumentality you have set forth in your last answer? How would you form a bat cylinder over a perforated cone?

A. I don't understand that question.

214 *Direct resumed by Mr. Keller.*

Q. 118. On your cross-examination, you have testified that the Wells machine made with a delivery aperture of the trunk, in the form of a parallelogram, or with the upper end larger than the lower end, would be in accordance with the Wells invention. Would a machine so constructed be of any practical utility in the business of making fur hat bodies?

A. To the best of my recollection, the hypothetical machine was arrived at by first being constructed with a proper delivery
215 aperture, as described in the patent, and afterwards altered to the form supposed or assumed by the operator. But however such construction is arrived at, a Wells machine having such an aperture would not be of any practical utility in forming hat bodies.

Q. 119. Would a machine constructed with a delivery aperture of the forms denoted in the preceding question, and in the absence of all other instruction, instruct a person how to make a practical hat body; and if not, why not?

A. It would not, because it does not solve the problem
216 of a proper distribution of the fur upon the cone.

Q. 120. On your cross-examination you have stated that the use of a machine like Exhibit A, and fed with the fur laid upon that side of the apron towards the tip of the cone, would not be a user of the Wells invention, as described in the reissued patent of September 30, 1856; but if fed with the fur thickest on that side of the apron towards the base of the cone, would be a user of the invention described in said patent. Will you state why, in one instance, it would be within, and in the other without, the
217 invention described in the said patent?

A. Because in the one instance the fur would be distributed in properly regulated quantities upon the cone, and in the other it would not.

Q. 121. In both cases are or not the two machines constructed alike?

A. In both cases the machine used is the same when out of use.

Q. 122. What then is needed to make them alike in use?

A. That they should be used in like manner, because if
218 a person were to construct the machine for the purpose of using it by feeding thicker at the end opposite the tip, and should so use it, he would fail of solving the problem of forming hat bodies by throwing the fur in properly regulated quantities upon a section of a perforated cone.

HERVEY WATERS.

Sworn to before me this 30th September, 1837.

R. E. STILWELL,
U. S. Com.

UNITED STATES OF AMERICA,
219 *Southern District of New York,*
City, County, and State of New York, ss.

Be it remembered, that on this first day of October, in the year of our Lord one thousand eight hundred and fifty-seven, I, R. E. Stilwell, a commissioner duly appointed by the circuit court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in
220 civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more

convenient taking of affidavits and bail in civil causes depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, in the city of New York, in the said southern district of New York, in the State
221 aforesaid, James J. Mapes, to testify and the truth to say, on the part and behalf of the complainants in a certain suit or matter of controversy, now depending and undetermined, in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants.

And the said James J. Mapes being about the age of fifty years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the
222 matter of controversy aforesaid, I did carefully examine the said James J. Mapes, and he did thereupon depose, testify, and say as follows, namely:

Q. 1. What is your name, age, residence, and occupation?

A. My name is James J. Mapes; aged fifty years and upwards; reside at Newark, in New Jersey, and am a consulting engineer.

Q. 2. State what have been your means for acquiring a knowledge of science applied to the arts of the progress of inven-
223 tions, and the analysis of patented inventions.

A. I have been engaged practically as a builder and constructor of machinery. I have been chairman of the committee of arts and sciences of the American Institute and the Mechanics' Institute in the city of New York, and often called as a witness in patent cases.

Q. 3. Have you examined the two reissues of a patent granted to Henry A. Wells on the 25th April, 1846, for an improvement in the machinery and process for the manufacture of hat bodies, which reissues were granted to Charles St. John, Henry A.
224 Burr, Albert H. Wright, and James M. Riblet, as assignees of the said Henry A. Wells? the one reissued on the 30th day of September, 1856, and the other on the 7th October, 1856; and if yea, state whether you understand the same.

A. Yes.

Q. 4. Will you state what, in your opinion, is the principle or mode of operation in machinery for forming hat bodies described in the reissued patent of Sept. 30th, 1856.

A. It consists of forming a bat of fur fibres by throwing
225 the fur in properly regulated quantities against the section of the circumference of a perforated cone, or other form, as the same is rotated to present in succession every part of the cir-

cumference to the current of impelled fur, and thereby obtain the required thickness of bat, when this is combined with the holding of the fibres on the cone during the operation, by the pressure of the surrounding atmosphere, induced by exhausting the air from within the said perforated cone or other form.

Q. 5. What is the manner of special application of the
226 principle or mode of operation described in your last answer, which you find described and represented in said patent?

A. The operative spreads the stock of fur in separate parcels, each sufficient for the formation of a bat, according to its intended weight, on the lower feed-apron. This in turn presents the fur to the action of a brush, while the fur is being carried with the apron over a slightly rounded edge, or the substituted metallic roller, thus causing the fur to be pinched or held between the up-
227 per and lower apron, or parts before described, so as to present the fur properly to the action of the brush, which brush is revolved with great velocity, thus acting upon the fur fibres, carrying them into the trunk and supplying the current of air to carry them forward to the mouth of this trunk, there to meet with a current engendered by an exhaust within the cone, thus carrying the fur upon the surface of this perforated cone. The forward end of the trunk before spoken of is provided with a hinged flap or hood, regulated by a cam lever, which hood, inconjunction
228 with the change of figure of the trunk, as it approaches the perforated cone, causes the fur to be distributed on the cone in variable thicknesses, as may be required in the direction of its length, while the continued rotation of the cone secures their even distribution in the direction of its circumference, it being required to be so deposited as to give greater thickness near the brim, and less at the crown or tip.

Q. 6. Will you state whether provision is made for operating the flap or hood by means other than a cam lever? and if yea, specify such other means.

229 A. Such provision is made, and the patent recites "that the hood may be operated by hand instead of machinery."

Q. 7. Please state what, in your opinion, constitutes the principle, or mode of operation, of the invention described in the other reissued patent, dated October 7, 1856.

A. It consists in forming a bat of fur fibres on a perforated cone of variable thickness in the direction of its length, in combination with the hardening of such bat while on such cone or other form, to give it the required consistency to admit of taking it off
230 in a suitable condition for sizing, by the well-known process of felting, the specialties of the operation prior to hardening being the same as are given in my answer to interrogatory number five direct. The preparation of the formed bat for harden-

ing is effected by covering it with pieces of felt, or fulled cloth, just taken from hot water, and wound around the cone by its own rotation; after applying its end thereto. Another piece of cloth is put on the tip, and then a perforated metallic cone is placed over the whole, more effectually to hold the fibres of the bat and
231 make a slight pressure on them, while it is immersed in the hot water to harden. This method causes the hardening to take place much more rapidly and perfectly than when attempted to be performed by slight pressure and mechanical agitation, as had been previously practised by various methods. But the hardening of the bat on the cone is a peculiarity of the operation as given in this patent, and the method selected for doing it more perfect and practical than those usually appealed to for hardening where cones were not supplied with fur in variable thicknesses in the direction of their length, in combination with hardening
232 the bat while upon them.

Q. 8. Please examine model Exhibit A, on the part of the plaintiffs, and assuming it to be so modified, that the cap represented on it is extended so as to cover the upper part of the upper picker roller, and the cone when placed in position to receive the fur from the pickers is proportionably nearer to the pickers than is represented in that model, and state whether in your opinion a machine represented by said model would be substantially like, or substantially different, in principle or mode of operation,
233 from the machine described in the before-named reissued patent, dated Sept. 30, 1856, and assuming also that the fur is fed on the feed-apron of said machine by the hand of the operator in greater thickness on that side of the apron corresponding in line with the base of the cone, and gradually thinner towards the other side of the apron.

A. Such a machine as is represented by this model, amended as proposed in the question, and operated as there named, would be substantially like the machine and mode of operation de-
234 scribed in the patent to Wells, dated the 30th September, 1856. It possesses the same functions produced by equivalent means, enabling it to form a bat of fur fibres by throwing the fur in properly regulated quantities against the section of the circumference of a perforated cone, or other form, as the same is rotated, to present in succession every part of the circumference thereof to the current of impelled fur, and thereby to obtain the required thickness of bat. And I find this combined with the holding of the fibres on the cone during the operation, by the pressure of the surrounding atmosphere induced by ex-
235 hausting the air from within the said perforated cone.

Q. 9. I perceive that in the Wells machine, as described in the before-named reissued patent of September 30, 1856, the axis of the perforated cone on which the bat is formed is placed

at right angles to the axis of the picker, and in model Exhibit A the axis of the cone is placed in a line nearly parallel with the axis of the picker. Does that constitute a substantial difference in the principle or mode of operation of the two machines; and if not, why?

A. Such difference I consider to be formal and not sub-
236 stantial—the object of the picker being to disintegrate, or separate, the fur in the Wells machine, (there known as a brush,) and to assist in impelling the fur to the cone; the figure of the impinged quantity being regulated by the form of the trunk, and the combined influences of the draft consequent upon the exhaust, and not upon the immediate proximity of the brush or picker to the cone, whereas in Exhibit A, the short channel way, and the close proximity of the picker to the cone, renders it necessary to regulate the figure of impinged fur by the manner in
237 which it is laid upon the apron, said differences of configuration of parts, and operation of the machine, consequent upon the changes, not requiring invention, but simply the exercise of mechanical skill, called for by the difference of construction—both machines in common having the same objects, as results, and brought about by substantially the same way. I neglected in my above answer, to state that the axis of the cone, and the axis of the delivery mouth of the trunk or channel way in both machines, are alike parallel; and also the hinged hood of the Wells ma-
238 chine is so regulated as to affect the direction of the fur in its impingement upon the cone, so as to render the quantity variable in the direction of the length of the cone; and the patent recites that the hood may be operated by hand instead of machinery, thus substituting the attention, skill, and cost of an operative for the positive regularity and cheapness of mechanical movements. Thus it is evident that the distribution of the fur upon the cone or other form in variable quantities in the direction of their length, may be brought about by hand control in
239 either machine, and the exercise of this control, whether performed before or behind the picker, constitutes but a formal, and not a substantial difference.

Q. 10. If the axis of the cone in the Wells machine was changed from its position of right angle to the axis of the picker, and placed parallel therewith, what, if any modification would be required to be made in the intermediate parts between the cone and the picker?

A. merely a change of the figure of the channel way for conducting the fur to the cone.

240 Q. 11. Would such change be formal or substantial?

A. It would be formal and not substantial.

Q. 12. In case of such modification in the position of the cone, and the form of the trunk, as specified in the two last questions and answers, could the required distribution of fur be obtained to give the required varying thickness of fur in the direction of the length

of the cone without the use of the hinged hood; and if so, by what means?

A. The only means evident on the face of the supposed machine by which the use of the hinged hood could be avoided, would
241 be to shorten the channel way to such a length as to enable the fur to be fed on the feed-table in variable quantities, so as to bring about the proper thickness in the relative parts of the cone. Such change constitutes but a formal change.

Q. 13. Assuming that in working a machine made in accordance with model Exhibit A, on the part of the plaintiffs, after the required thickness of bat has been formed on a cone, another perforated cone of slightly larger diameter is placed over such bat, and the cone-stand moved around about one-third the circum-
242 ference of the stand, and brought under a set of rollers, which bear upon the upper part of the outer cone, to make a portion of its inner circumference bear upon the bat, and a button on the tip of the outer cone is put in connection with an arm, and a longitudinal jiggering or vibrating motion be given to the rollers and arm, and by them to the outer cone while the cones and bat are slowly rotated on their axis, to partially harden the bat, while the pressure of the atmosphere is retained upon the bat by having the inside of the inner cone maintained in connection with
243 the exhausting fan; would such mode of procedure be substantially like, or substantially different from the invention described in the before-named reissued patent, dated October 7, 1856, as the same has been defined by you in your testimony?

A. It would be substantially like the patent referred to in the above question. A leading function of the Wells contrivance, and forming part of the combination which I have before defined, is the holding of the fur bat on the cone during the process of
244 hardening, and the special mode of hardening as supposed in the question, other than being done upon the cone, is not novel; it has been long known that the mechanical agitation, such as those described, would slowly harden fur, and the acceleration of this hardening has been brought about by heat and moisture, so that while the dry process is scarcely practical from the slowness of the operation, still even the passage of a humid atmosphere through the bat, caused by the exhaust within the cone, will materially accelerate the hardening, rendering it practical to a more profitable extent; and when this moisture is accompanied by heat, as
245 with a steam bath, external and adjacent to the cone, the time consumed in hardening renders it more practical and profitable, and when the one of the many known methods selected by Wells is applied to a bat, while on the cone, the novelty or invention consists in its application to the bat, while so circumstanced, in combination with the other parts of the process, and not to the hardening by hot water in place of mechanical agitation.

Q. 14. Will you examine letters patent granted to A. B. Taylor and H. A. Burr for improvement in machinery for making
246 hat bodies, bearing date February 9th, 1847, and the model marked "Exhibit B, J. W. M., U. S. Com., and state what mode is therein described and represented for varying the proportional deposit of fur along the length of the cone?

A. The channel way or fur passage between the brush and the cone is made with thin metallic sides, ending in a conical form at the mouth or exit point. The roof or cover of this channel way may be elevated or depressed at will, so as to alter the shape
247 and size of the fur exit or mouth, and thus doing away with the use of the hood, as represented in the Wells patent.

Q. 15. In your opinion would a machine so constructed and operated involve the principle or mode of operation described in the reissued patent to St. John and others of Sept. 30, 1856, as the same has been defined by you, or would such machine be substantially different therefrom?

A. No. I do not think it would be substantially different; that is, it does involve the same mode of operation.

Q. 16. In your opinion is the invention described in the
248 said reissued patent of St. John and others of Sept. 30, 1856, a useful invention?

A. Yes, undoubtedly.

Q. 17. In your opinion is the invention described in the said reissued patent of St. John and others of Oct. 7, 1856, a useful invention?

A. Yes.

Cross-examined by Mr. Gifford, Counsel for the Defendants.

X 18. State what you understand to be Wells' process of
249 preparing a bat to be removed from the cone; state in detail what steps or successive acts constitute that process.

A. The preparation of the formed bat for hardening prior to its final removal from the cone, is effected by covering it with pieces of felt or fulled cloth just taken from hot water. The piece of felt cloth rolled upon a roller is taken from the hot water, and one end is applied to the surface of the bat, and as the cone rotates, the felt cloth winds from the roller on the bat on the cone. Another piece of felt cloth is put on the tip, and then a strong perforated metallic cone is put over the whole, the more effectually to hold the
250 fibres of the bat, and to make a slight pressure on them while it is immersed in the hot water to harden. As the perforated cone is better when made very thin, the pressure of the water when drawing it out of the kettle after the bat has been hardened, tends to, and would collapse it, and therefore, to prevent this, another perforated metallic cone is put inside, (before the whole is immersed in hot water,) to sustain the pressure in drawing the

whole out of the hardening kettle. The inner sustaining cone may be dispensed with if desired, by making the cone of greater thickness and strength.

251 X 19. You have intended by your last answer to state what Wells does to prepare the bat to be removed from the cone, I suppose, do you not?

A. Yes.

X 20. In your answer to the 18th question you speak of "final removal;" I don't suppose you mean by that, there is more than one removal from the cone, do you?

A. No, the word "final" is probably redundant.

X 21. In your answer to the 13th question do you mean that hardening bats of fur on a cone by what you call "mechani-

252 cal agitation" was not novel in the year 1855?

A. Hardening bats when on a cone there formed in the manner proposed by Wells, I conceive was novel until his invention. But hardening bats by mechanical action was known previous to the year 1855.

X 22. The question is, whether, as far as you know, the hardening of fur bats while on a cone by what you term "mechanical agitation" in the 13th question, was novel in the year 1855, and if you know of any prior instance of such hardening, then state it.

253 A. I know of no hardening on a cone by mechanical agitation where the cone was perforated, and was made the instrument of collecting the fur in part prior to the year 1855, where the fur was distributed in variable proportions to its length. But I do know of the hardening of fur bats on forms by mechanical agitation prior to that day, partial hardening having been before given to them.

X 23. Don't you know that the 22d question contained no such limitations as you have mixed up with your statement last made, and that it asks you to state the instance of any such hard-

254 ening prior to the time therein mentioned?

A. Yes, I clearly understand that those limitations are not in the question, and I place them in the answer to prevent any ambiguity as to my statements relative to the hardening in the Wells process, as compared to my statements relative to the hardening of bats by mechanical agitation, where I did not use the word cone as in the Wells connection, and the course is rendered necessary by the introduction of the word "cone" in a previous question, where such term is assumed, and is not a copy of my former remark.

255 X 24. Did you not place those limitations in that answer also for the purpose of making that answer obscure, as compared with the question which precedes it, and does it not make that answer more obscure in reference to the question which im-

mediately precedes it, than a direct answer to that question without such limitations would have been?

A. I did not answer with a view of rendering my replies obscure, nor do I think that it had that effect, nor do I believe that the question permitted of a categorical reply without producing ambiguity, and preventing a truthful construction from be-
256 ing readily given to my answers; the word "cone" having been irrelevantly introduced in connection with hardening, having in no part of my direct examination spoken of the mechanical hardening on a cone other than in the Wells connection, but simply of the mechanical hardening of bats.

X 25. Did you not anywhere in your direct examination speak of hardening a bat on a cone in reference to a machine like or similar to model A, or do you exclude that kind of hardening from what you call "mechanical hardening," or "hardening by
257 agitation?"

A. It was while describing the chemical hardening of the bat on the cone in defendants' machine, as represented in model A, that I spoke of bats having been hardened by mechanical agitation before, and the doing of it in this machine while on the cone constituted its substantiality in process with Wells' invention. The hardening of bats by various methods having been before known, while the cone, as there represented in connection with the other parts of the machine and process, constituted the inven-
258 tion of Wells, and in no other connection did I speak of hardening bats on the cone.

Q. 26. Now endeavor to understand, and then give a direct answer to this question—that is, whether in your direct examination you meant to be understood as meaning that you knew of any instance of hardening a fur bat while on a cone by mechanical agitation, which took place prior to the year 1856?

A. No; nor did I so state; nor did I ever know of hardening on a cone as a figure, by any means, until I saw these hat ma-
259 chines at work at Newark.

X 27. Did you, prior to that time, know of hardening a bat on a cone as not a figure?

A. The language is ambiguous, and I don't comprehend its meaning—the question to me appearing as being incompatible to an answer of any kind.

X 28. Did you not, in your answer to the 26th question, speak of hardening "on a cone as a figure?"

A. I spoke of never having seen hardening on a cone as a figure prior to the hat machines, meaning thereby that I had seen
260 bats hardened on other figures, but not on that figure known as a cone.

X 29. Did not the words used by you in your answer to the 26th interrogatory, and quoted in the 28th interrogatory, insinuate

that you had known bats to be hardened on a cone other than as a figure?

A. Distinctly no; and as soon as practicable in direct reply, I stated unequivocally that I had never seen a bat on a cone as a figure hardened at all, until I saw it in the hat machines; and as soon after as practicable, I as distinctly stated that I had
261 seen bats hardened on figures, not a cone.

X 30. Have you known of bats being hardened on cones without water until very recently?

A. Yes. I saw experiments made many years since at the corner of Burling Slip and Pearl street, with a view to make mits, gloves, etc., or to be used as the linings for mits and gloves. The mechanical agitation, although practicable, was too slow to be practical and profitable, but by the addition of heat and moisture, the hardening was perfected to a greater extent and in less time.

This answer was given, supposing the question to be as
262 read to me, "on figures, not a cone." My attention being again called to the question No. 30, I answer I have not.

X 31. Explain to us what you mean by "dry process" in reference to the hardening of fur bats. You employ those terms in your answer to the 13th question.

A. By "dry process," I mean the mechanical agitation of the fur without moisture.

X 32. Give us an idea in reference to what you said of the influence of "a humid atmosphere;" how much moisture you
263 think it would require to change it from a dry process to some other process.

A. Questions of degree are difficult to define. But when atmosphere, loaded with moisture, is caused to pass through fur in sufficient quantities to moisten the surface of the fibre by condensation, it will act as a lubricator, and less mechanical action will be required to cause the necessary motion of the particles for hardening.

X 33. Do you mean by that, in such case the advantage would be by the dampness, causing the fibres of fur to more easily
264 slip or slide upon one another, and in consequence of which they would more readily work in among each other?

A. Yes.

X 34. What do you think would be the effect of a small quantity of oil in such a case?

A. I don't know. I never tried it.

X 35. Oil is a better lubricating substance than water, is it not?

A. For some things, and not for others.

X 36. For what is it not a better lubricating substance?
265 A. For puddling soils, or many silicious substances; thus

some hones, known as water-hones, would be so lubricated by oil that a razor might be passed over them without being sharpened or abraded; while with other kinds of stones the oil will not lubricate so perfectly, and they thereupon become good oil-hones.

X 37. In your answer to the 32d question, you say, "that atmosphere loaded with moisture," etc.; can you give us any idea how much, or to what extent it would require to be so
266 loaded to change the process of dry hardening to some other process?

A. Practically, it would be called dry hardening where no means had been resorted to for supplying moisture to the surrounding atmosphere.

X 38. You have answered a question in your direct examination, being question 13, in reference to hardening a bat, in which question is an assumption, mentioned in these words, namely, "another perforated cone of slightly larger diameter is placed over such bat." In giving your answer thereto, how much
267 larger did you assume that cone to be in diameter?

A. Sufficiently larger to admit the thickness of the bat to rest freely between the two, so that the pressure on the upper side at the point where contact with the rollers would be effected. To give it accurately, it would be required to know the size of the inner cone, the thickness of the intended bat, and a sufficient amount of practice in the manipulation to judge of the best distance between the two. The leading feature theoretically is, that the outer cone should always exert a pressure, so that a
268 more intense one on any part would affect all other parts in a degree.

X 39. How affect all other parts?

A. By pressure in degree and motion in degree, as would be the case on fibres of a loose bat, held between two cones, compressing it lightly on all its parts, while being more severely pressed at any one part, and the point of this pressure continually changing.

X 40. In reference to pressure in your last answer, in what direction do you mean such pressure as you therein refer to is
269 made compared with the direction of the axis of the cone?

A. In a jiggering motion the pressure and its resultants may be conceived to be too confused to define the direction of the resulting forces.

X 41. The inquiry in the last question, in reference to the direction of the pressure, referred only to the pressure which you introduce and mention, in your answer to the 40th question; please answer the 41st question so explained.

A. The pressure I refer to was from the roller, above, and upon the outer cone, pressing downward, but at the same time,
270 having a jiggering motion renders it impossible to define the resolution of those forces in all their directions.

X 42. When answering the 13th question, if you understand that question, to assume that the outer cone was larger in diameter than the inner one, and had any idea how much larger it was so assumed to be, then state in measurement how much larger you understood it to be, or so assumed it to be.

A. I did not assume any other fact than that it was
271 larger.

X 43. In the 8th direct question your attention was called to model Exhibit A, and in that question it was assumed that the cap represented on that model be extended so as to cover the upper part of the upper picker-roller, and that the cone when placed in position to receive the fur from the pickers be proportionably nearer to the pickers than is represented in that model. Now if the question had been put in reference to the model as it is, or, in other words, without those assumptions, would such omission of those assumptions have changed your answer as to whether
272 the machine would be substantially like or substantially different in principle or mode of operation from the machine described in the reissued patent of Sept. 30, 1856?

A. No.

X 44. What is your rule or means of determining whether a new thing produced by another person has required invention?

A. The fact of finding it to be a new thing, developing functions useful and original.

273 X 45. Are you aware that you have predicated your answer upon an assumption that such thing is original?

A. Why, of course I assume that to be original which seems to me to be so, until I am convinced I am in error.

X 46. When you find an article consisting of a combination of parts or an arrangement of parts, the joint operation of which produce a practical result, and which article you had never seen, or known of before, what means do you resort to to qualify yourself to be able to swear positively that the production of it did not require invention?

274 A. In such cases I do not swear, or give opinions.

X 47. When did you first see a revolving picker, or brush, to disintegrate fur or other fibrous material?

A. I can't give dates; it was before the date of any patent in question here.

X 48. How was the fibrous material in that case fed to the picker?

A. You have asked me a general question, and then referred to a case you do not define. I do not know what case you refer to. If by fibrous material you refer to fur alone, it will give me
275 pleasure to reply.

X 49. Did any picker covered by your answer to the 48th

question have an endless apron and feeding-rollers to feed the fibrous material to the picker?

A. Yes.

X 50. In what direction did the fibrous material go after it left the picker in those cases?

A. In all directions, unless held by hood, channel, or form. Such machines are common to paper-mills, and many other styles of manufacture where fibrous materials are pulled apart by
276 machinery.

X 51. In such cases in what direction does the fibrous material go on leaving the picker?

A. In all directions, unless controlled by hood, channel, or other means.

X 52. Do you mean to say, or insinuate, that you can feed fibrous material to a rotating picker, with any practical result, such pickers as you have referred to in mills, without some means to deflect or direct the fibrous material from the picker?

277 A. No; I have neither so said nor insinuated.

X 53. Then state in what direction the fibrous material would go on leaving the picker, or does go on leaving the picker, in the practical operation of the pickers in the mills or manufactories you have mentioned.

A. You mean in what point of the compass? If you mean does it return to the apron of the picker, such machines usually have a guard to prevent such return, and the further use required usually decides the kind of arrangement and directing travel of the picked material. Thus disintegrated wool for felting, yarn, coat-
278 ing, etc., is generally carried off on a second apron through a trunk; while cotton fibre in its delivery from a cotton-gin is carried to a lint-room. The question is general, and includes all machines for disintegrating fibrous material. If intended to relate only to furs, I can answer more specifically.

X 54. What more specific answer do you refer to in the last part of your last answer? Give it, if you have any.

A. An answer to any specific question put.

X 55. In answer to the 54th question, you speak of a
279 picker having a guard in some of the machines referred to. What was the function of that guard?

A. To prevent the return of picked material to the wrong side of the picker.

X 56. How does such guard prevent such return?

A. By stopping those portions as are thrown against the guard by the picker itself.

X 57. Does such guard in those instances change the direction of the material?

A. It does change the direction.

280 X 58. When did you first become acquainted with a feed-

ing apparatus consisting of two endless aprons as you find it in model "Exhibit E, H. A. Wells"?

A. For the purposes there used, never, until I found it in that patent.

X 59. If you remove the trunk from a machine constructed like said model E, leaving all other parts the same, and then put it in operation, what would be the result in reference to the direction and deposition of the fur after leaving the picker?

281 A. Under such conditions it would disorganize the machine, and thus render it inefficient.

X 60. In your answer to your direct examination, did you mean to be understood that there was a channel-way, or trunk, in model A?

A. Yes; and I was then requested to understand that the cone was placed nearer the picker than in the model, so that the short trunk, or channel-way, here represented, would be entirely sufficient to project the fur within the blast consequent upon the exhaustion of the cone, and this joint effect of the two blasts calculated

282 to develop the functions consequent upon the use of the cone and its auxiliaries.

(The counsel for the defendants objects to the statement of the witness volunteered after the answer "yes," as not responsive to the question, not necessary to make the answer understood—a mere repetition of what he has several times said, and as needlessly wasting time.)

X 61. What is there in model A which you call a trunk,

283 or channel-way?

A. The hood over and behind the picker and its two sides.

X 62. Do you find any hood over and beyond the picker in that model according to your theory; and if yea, of what does it consist?

A. According to the model as here exhibited, I find a hood and side attached; and as presented to me in my direct examination, where I was requested to consider the hood as covering the upper picker-roller, I find that channel-way of sufficient length for

284 pertinent use when the cone was placed nearer to—

(Counsel for the defendants objects to the witness's statement as not responsive to the question.)

the picker than when suggested to me.

X 63. Question repeated.

A. I do not comprehend what is meant by my theory.

X 64. If you think there is any hood in model A, then state of what it consists—that is, if possible, to make the question plainer, state what parts or pieces you think form such hood; and I

285 mean the model A as it is, without any supposed or imaginary alterations.

A. As the model now stands, and without taking into account the instructions given to me at the time of my direct examination, I should say that the hood and channel way were now imperfect, and the machine, as it here exists, could only operate in degree; that the back plate behind the picker, and the upper roller, or picker with the ends, would operate as a hood or channel-way on a portion of the fed fur, while a large portion would be thrown out of
286 the necessary line of travel, and only to that extent has the model a hood or channel-way.

X 65. By this last statement of yours do you mean to be understood that the copper plate, upper roller, or picker and end-pieces, form what you call a hood in that model?

A. To the extent named in my last answer, yes.

X 66. How much would it be necessary to shorten those end-pieces to destroy the hood?

A. So much as would prevent a portion of the fur from being thrown upon the cone.

287 X 67. Suppose that those end-pieces in which the pickers are hung consisted of straps or bars of iron, of size entirely sufficient to support the pickers, and standing in an inclined position, corresponding with the fronts of the pickers, and not extending forward as far even as the wood portion or rollers of the picker; in your judgment would there still be what you call a hood?

A. In the absence of experiment, my judgment is, that it would not so act, but to the extent that fur placed upon the apron with the view of depositing it in variable thickness on the
288 cone, in the direction of its length, would be the equivalent of a hood, trunk, or channel-way in that connection.

X 68. Would its equivalency depend upon the view with which fur might be applied?

A. Yes, assuredly.

Adjourned to half-past 9 a. m. to-morrow.

JAMES J. MAPES.

Sworn to before me, this 1st day of Oct., 1857.

R. E. STILWELL,
U. S. Com'r.

289 UNITED STATES OF AMERICA,
Southern District of New York,
City, County, and State of New York, ss.

Be it remembered, that on this 2d day of October, in the year of our Lord one thousand eight hundred and fifty-seven, I, R. E. Stilwell, a commissioner, duly appointed by the circuit court of the United States, for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress
290 entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the

United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did
291 call and cause to be and personally appear before me, at my office, 9 College Place, in the city of New York, in the said southern district of New York, in the State aforesaid, Henry B. Renwick, to testify and the truth to say, on the part and behalf of the complainants, in a certain suit or matter of controversy, now depending and undetermined, in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants.

292 And the said Henry B. Renwick being about the age of forty years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said Henry B. Renwick, and he did thereupon depose, testify and say as follows, namely:

Q. 1. What is your name, age, residence, and occcupation?

A. My name is Henry B. Renwick; aged forty years; reside in the city of New York, and am a civil and mechanical
293 engineer.

Q. 2. State fully your means for acquiring knowledge of science as applied to the arts of the progress of patented inventions, and of the analysis of inventions, to distinguish between formal and substantial differences.

A. I have, since I left college, been engaged more or less in mechanical pursuits. I was also for about four years and a half a principal examiner in the United States Patent Office, and have, since the year 1852, been examined as expert in numerous patent suits in the United States circuit courts, and have frequently
294 been called to examine as to the scope and novelty of patented inventions.

Q. 3. Have you examined the two reissues of a patent granted to Henry A. Wells, on the 25th April, 1846, for an improvement in machinery and process for the manufacture of hat bodies, which said reissues were granted to Charles St. John, Henry A. Burr, Albert H. Wright, and James M. Riblet, as assignees of the said Henry A. Wells, one of the said reissues bearing date the 30th day of Sept., 1856, and the other 7th Oct., 1856; and if yea,
295 state whether you understand the same, and whether the descriptions are sufficient to enable a person skilled in the arts to make, construct, and use the same?

A. I have examined the reissued patents named in the question.

I believe that I understand them, and it is my opinion that the descriptions are sufficient to enable a person skilled in the art to construct and use the apparatus therein described.

Q. 4. Will you state what in your opinion is the principle or mode of operation of the machinery for forming the bodies
296 described in said reissued patent of Sept. 30, 1856, and also the special mode of application therein described?

A. The mode of operation in the machinery therein described is the formation of a bat for a hat body, by impelling a combined current of fur and air, in the form of a sheet of proper thickness, towards a section of a constantly revolving perforated and exhausted cone, currents of air entering into the perforation during the process of formation, and serving the double purpose,
297 first of deflecting the mingled current before spoken of, and second of holding the particles of fur upon the cone; the rotation of the cone being for the purpose of equalizing the thickness of fur in lines passing round the cone in planes perpendicular to its axis, or nea ly so. This mode of operation is such that it gives a facility of varying the thickness of the bat in the direction of the length of the cone, and the mode of operation of the machine described in the patent is such as to enable the operator and builder to make such variation of thickness in such proportion as may be necessary.

298 The special mode of application therein described involves certain machinery, consisting, 1st, of a feeding-apron, mounted on rollers, upon which the fur is deposited, and by which it is carried along; 2d, of a nipping apparatus, which nips the particles of fur in succession; 3d, of a rapidly revolving cylinder covered with rows of bristles, which seize the particles of fur. This revolving brush has a guard or cover on that side of it nearest the nipping apparatus, of such shape and demensions as will prevent the fur from being thrown, except in a general direction,
299 away from the feeding apparatus. This brush in its rotation produces a current of air, and throws a combined current of air and fur in the general direction as before stated. This combined current then enters a trunk, forming a continuation in fact of the cover, which trunk, by virtue of its shape and a hood acting in connection therewith, changes the shape of the sheet of fur, causing it to be projected in a proper manner toward a constantly revolving perforated exhausted cone. The currents of air entering the cone cause the combined current of air and fur
300 to be deflected in such manner that the fur is deposited upon constantly changing sections of the revolving cone, or former, where it is held by the pressure of the atmosphere induced by the exhaustion of the cone through the agency of a revolving fan, whose eye, or the eye of which, is in connection with the interior of the cone.

Q. 5. Please state what in your opinion is the principle or mode of operation of the invention described in the other said reissued patent, dated October 7, 1856, together with the special mode of application therein described.

301 A. The mode of operation therein described, and the special means of carrying it out so far as they relate to the formation of a bat, are the same as set forth in my last answer. But in addition there is another operation which has for its object the hardening of the bat to such an extent that it may be safely removed from the cone upon which it was formed, and the mode of hardening specially described is by enveloping the bat with dampened cloths, and then inverting over those cloths another perforated cone, when the former bat, cloths, and secondary cone are

302 all removed from the machine and immersed in a vessel of hot water. There is also described in the patent a third cone, which is slipped inside of the first cone or former, prior to the immersion in water. But this last cone, as far as I understand, has nothing to do with the hardening process, but merely protects the original cone from injury.

Q. 6. Please examine model Exhibit A, on the part of the plaintiffs, and assuming the fur to be fed on the feed-apron thereof thickest on that side opposite the base of the cone, and gra-

303 dually thinner towards the other side, and state whether, in your opinion, a machine so constructed and operated would be substantially like, or substantially different from the mode of operation described in the before named reissued patent of September 30, 1856, whether the cap on such machine be made in the proportions, form, and location of the cap marked A 1, on the model, or be extended up so as to cover the upper picker-roller, and whether the cone on which the bat is to be formed be placed in the position represented in the said model, or relatively nearer to the pickers, and give your reasons for your opinion.

304 A. From what I have seen of the operation of machines constructed substantially in accordance with the patents before referred to, and from various experiments I have made with them and with other experimental machines, I am of opinion that the mode of operation resulting in the formation of a hat body would be substantially the same in a machine constructed like Ex. A, as it is in a machine constructed substantially in accordance with the patent referred to; and I am of this opinion for the reason that I believe that a machine made like Exhibit

305 A would throw a combined current of air and fur towards a constantly revolving perforated and exhausted cone, upon a section of the circumference of which the fur would be deposited by deflection of the combined current by means of air entering into the interior of the cone through the perforations, the fur being held, when deposited, by pressure of the atmosphere, induced by

exhaustion of the cone, such method of deposition giving facility to the operator to deposit a bat in unequal thickness along the length of the cone, by properly depositing the fur upon the
306 feeding apron, while the revolution of the cone causes the bat to be of equal thickness in lines surrounding the cone in planes perpendicular to its axis. And I find in Exhibit A, a feeding apron mounted on rollers, and a nipping apparatus, 3d a rapidly rotating cylinder armed with rows of wire, which seize the fur as delivered by the nipping rollers; above this cylinder is another rapidly rotating cylinder, similarly armed, and behind the two cylinders, or between them and the feeding apparatus, is a cap or cover. The armed cylinders revolve in opposite directions, and both, as I believe, induce currents of air, the cap pre-
307 venting the fur from being thrown backwards towards the feeding apron, and producing a dead or partially dead space of air behind the two armed cylinders, the effect being such that a combined current of air and fur is impelled in lines perpendicular, or nearly so, to lines passing through the axis of the armed cylinders or pickers; and I consider that both the cap and the upper cylinder are necessary to give direction to this combined current, which is impelled towards a constantly revolving exhausted cone, and is deflected by currents of air passing into such cone
308 through the perforations in such manner that the fur is deposited upon a section of that cone, and held there by the pressure of the air. The revolution of this cone equalizes the bat in the lines before mentioned, and the fact of the fur being deposited upon a section of the cone, gives facility to the operator to make the bat of unequal thickness in the direction before stated. The cone is exhausted by means of a suction or exhaust fan, so arranged that the interior of the cone is in connection with the eye of the fan. I think it probable that a small current containing a small quantity of fur would be thrown out between the cap
309 and the upper roller. If the cap were like A 1, this current would go to waste, inasmuch as it would not aid in the formation of the bat; but if the cap were so extended as to direct this small current parallel, or nearly so, to the main combined current, (or that proceeding from between the pickers in lines perpendicular, or nearly so, to those joining their axis,) then I think that the small current would also be deflected by the currents of air entering the cone, and the fur borne by the small current would aid in making up the section of fur of which the bat is
310 being formed. I therefore think that too short a cap is no more than a leak or wastage space, and that such a cap would affect only in degree the operation of the machine. I am also of the opinion that the cone might be brought nearer to, or removed farther from the pickers, within certain limits which must be determined by experiment, without affecting the operation of

the machine, provided the relative intensity of the impelling and deflecting and holding current were so altered as to be adapted to the different distances between the cone and the pickers. I find
311 in this machine the axis of the cone is parallel or nearly so to the axis of the pickers, instead of being at right angles thereto, as in the patented Wells machine, and I also find in Ex. A no continuation of the cap, so as to form the trunk of the Wells machine; the arrangement of Exhibit A being such that the fur is deposited upon a section of the cone through the directing of the impelled current by the cap and upper picker-roller, as before described.

Q. 7. Have you ever seen in practical operation a machine or machines constructed like model Ex. A? and if yea, state
312 when, and where, and at whose establishment.

A. I have seen at Newark, in New Jersey, at an establishment near the inclined plane of the Morris canal, and I think about two years ago, not being able to remember the date within several months, machines constructed like model Ex. A, except that I think the pickers and cap were somewhat different in construction, although they were such as to throw a current of air and fur towards the rotating exhausted cone. I was told who were the owners of the factory, but I do not now remember.

313 Q. 8. Do you remember making an affidavit to be read in a suit in the circuit court of the United States for the district of New Jersey, in which Henry A. Burr and others were complainants, and Alva B. Taylor and another defendants?

A. I do.

Q. 9. Did you examine the machines referred to in the answer to the 7th direct interrogatory with the view to make such affidavit, and in making such affidavit did you refer to said machines?

314 A. I did examine the machines, and I referred to them in that affidavit.

Q. 10. Will you examine letters patent granted to Alva B. Taylor and H. A. Burr for improvements in machinery for making hat bodies, dated on the 9th day of February, 1847, and the model marked "Exhibit B, J. W. N., U. S. Com.," and state what mode is therein described and represented for varying the proportional thickness of the bat, to be formed on a perforated exhausted cone, in the direction of its length?

315 A. I find described in that patent and represented in that model, a trunk, whose sides are made of metal so thin that the form of the delivery aperture of the trunk, and of the trunk itself, for a short distance from that delivery aperture, may be changed by bending by the hand, so as to deposit a bat differing in thickness along the length of the cone to such extent as may be desired.

Q. 11. Would a machine constructed in accordance with said

model involve the principle or mode of operation described in the reissued patent of Sept. 30, 1856, before recited, or be sub-
316 stantially different?

A. I have no doubt that it would involve substantially the same mode of operation.

Q. 12. Have you experimented on the machines for making fur hat bodies in the establishment of the complainants, in this city, with a view to determine in what manner the fibres of fur issue from the delivery aperture of the trunk, and the direction of that travel when the cone is exhausted and when the cone is not exhausted? and if yea, specify fully the result of such experi-
317 ments.

A. In a machine in the establishment named in the question, I stopped the revolution of the prforated exhausted cone, leaving all other parts of the machine in the same condition and motion that they ordinarily have when in operation; fur was then deposited on the feeding-apron, and was by the action of the machine deposited on a section of the exhausted cone. Such section being a little less than half the circumference of the cone at the base thereof, and a little more than half the circumference of the apex thereof, said section was thickest in a line opposite the centre of the
318 trunk, or thereabouts, and diminished gradually to nothing on each side. I made several experiments, always with substantially the same result. I then threw the belt off the exhausting-fan pulley and permitted the cone to revolve, all other parts of the machine being in their ordinary working condition; fur being then fed upon the apron, was impelled through the trunk past each side of the cone into the room.

Q. 13. In the first of the series of experiments related in your last answer, was the air exhausted from the cone; and in
319 the last series, was the cone exhausted, or not?

A. In the first series, the cone was exhausted and not rotated. In the second series, the cone rotated but was not exhausted.

Q. 14. Will you examine letters patent granted to Alva B. Taylor for improvement in machinery for forming hat bodies dated July 29, 1856, and state how the description of the construction and operation of the picking and deflecting-rollers correspond with, or differ from the picking and deflecting apparatus represented in model A?

A. In model A, the upper picker does not overhang the
320 lower one so much as is represented in the drawing of the patent, and there is no provision for the adjustment of the upper roller to the lower one, or of adjusting the position of the two together in relation to the cone, as set forth and shown in that patent, and the cap is of slightly different shape from cap A 1, and

there is nothing said in this patent about the office of the cap except that its use is to prevent fur from being accidentally passed over the upper feed-roller, called by me the nipping apparatus,
321 nor is there anything said in the patent about the probability of a small current of fur passing out between the cap and the upper picker-roller.

Q. 15. Assuming that in working a machine made in accordance with model Exhibit A, after the required thickness of bat has been formed on a cone, another perforated cone of about an inch in diameter greater at the base, more or less, is placed over such bat, and the cone stand moved around, and brought under a set of rollers which bear upon the upper part of the outer cone to make a section of its inner circumference bear upon the bat, and
322 a button on the tip of the outer cone put in connection with an arm, and a longitudinal jiggering or vibratory motion given to the rollers and arm, and by them to the outer cone, while the cones and bat are slowly rotated on their axis, to partially harden the bat, while the pressure of the atmosphere is retained upon the bat, by having the inside of the inner cone maintained in connection with the exhausting fan; would such mode of procedure involve the invention described in the before-recited reissued patent dated Oct. 7, 1856, as the same has been
323 defined by you in your testimony, or be substantially different therefrom?

A. I think the mode of operation recited in the question as applied to the partial hardening of a bat formed upon an exhausted cone, said bat having been formed in the mode that I believe the bat to be formed in that machine, would involve the invention set forth in the patent referred to in the question, as I believe that invention consists in combining the hardening so that the bat can be removed from the cone, with a method of forming the bat
324 so hardened substantially such as is set forth in that patent.

Cross-examined by Mr. Gifford, Counsel for the Defendants.

X 16. If I understand your last answer, you do not consider what you refer to as the invention of the reissued patent of October 7th, 1856, confined or limited to any particular way or means of hardening the bat on the cone. Is that so?

A. It is. I do not consider that the patent is limited to any special mode of hardening on the cone.

X 17. Look at the model marked "Exhibit B, J. W. N., U. S. commissioner," having the yielding lips to its mouth,
325 and suppose the trunk therein to be cut off where I have made the mark across the top, and down the sides, and the aperture end so severed from the other part to be removed, all other parts of the model remaining the same, and in the same position.

Would that model then be substantially like any model that has been exhibited to you, on your direct examination, in mode of operation, or principle?

A. If I understand your supposition—and I suppose I
326 do—I think it would be substantially different in mode of operation and principle, as I do not think fur would be deposited on a section of a cone in the manner which constitutes the mode of operation or principle in the patented machine or model A.

X 18. Take that model B, altered as set forth in the last question, and what must be done to it to make it like the machine described in the Wells reissued patents?

A. If by like, you mean precisely the same thing, you would have so to alter that machine as to conform to the specific
327 description in the Wells reissued patent. If you mean substantially alike, you can make it so by putting the sawed-off piece of the trunk back again, or by turning the cone over so that its axis would be horizontal.

X 19. If you turn the cone over as you say, would the machine admit of the same kind of use in feeding as it would, if you put the piece of the trunk back again, with the cone unturned?

A. If you wish to make a bat varying in thickness, it would not admit of the same mode of feeding, in so far as that relates
328 to the proportional distribution of fur upon the feeding-apron.

X 20. Well, don't you want to make a bat of variable thickness for a hat body, and have you not made that an important thing in giving your testimony?

A. Generally it is desired to make a bat of different thicknesses in the direction spoken of, and I have set forth in my testimony that the deposition of the fur upon a section of a cone afforded the requisite facility for so varying the thickness of a bat.

329 X 21. Have you, or not, in giving your testimony on the mode of operation in forming a bat for a hat body by the machines which have been exhibited to you on the part of the complainants, regarded the deposition of the fur on the cone in variable thicknesses in the line of the length of the cone as an essential thing?

A. I believe I have not so regarded it.

X 22. Do you now so regard it?

A. I do not.

X 23. Then do you say that your statement of opinion
330 in reference to the principle or mode of operation of machinery for forming hat bodies, described in the reissued patent of Sept. 30, 1856, and your statement of opinion in reference to similarity or dissimilarity thereto in the mode of operation of a machine like Exhibit A, would have been the same without

considering the element of depositing the fur at variable thicknesses as specified in the last question?

A. It would have been the same.

X 24. Suppose model A to be altered by substituting a
331 rotatory perforated horizontal disk with the air exhausted from below to receive the fur from the picker instead of the perforated exhausted cone to form bats for hat bodies, then as between the machine so altered and the machine described in the reissued patents, would your opinion on substantial identity of operation be the same as it is between model A unaltered by the substitution of the disk, and the machine described in the Wells patent?

A. If the flat rotating disk were properly placed in position relative to the picking and blowing cylinders, and the deflect-
332 ing and holding current were of such relative intensity that the fur would be deposited upon a section of the horizontal rotating disk, thus affording facility of regulation of thickness of bat in lines from the crown to the brim of the hat, my opinion with regard to such a machine would be the same as it is with regard to Exhibit A, when either the supposed machine or that exhibit is compared with the Wells machine.

X 25. Suppose, instead of substituting in model A the horizontal disk, as set forth in the last question, you substitute a rotating perforated cylinder exhausted of air, to receive the fur pro-
334 jected from the picker to form bats to make hat bodies, between the model A so altered and the Wells machine described in said reissued patents; would your opinion on substantial identity be the same as it is between model A without such alteration and the Wells machine?

A. I cannot answer that question without being instructed as to how the cylinder is situated, what relative position it has to the pickers, through what part of it it is exhausted, and whether its ends, or either of them, are closed up or opened.

335 X 26. Let one end of the cylinder be closed up, let the other end be placed on a projection of the cone stand, the same as is the large end of one of the cones, so as to communicate with the exhaust, and let the cylinder be parallel with the picker, and let the cylinder be at the proper distance from the pickers to receive the fur.

A. This is the first time that that question has been presented to my mind, whereas I have considered attentively the supposition on which the former question was based; but if the invention of Wells be limited, as I suppose it is, to the formation of bats
336 having such analogy in shape to a cone that a hat could be formed out of them, I should think that a machine like one in the present question is such, that my opinion with regard to it would be varied from what it is in regard to Exhibit A, both being referred to the Wells machine.

X 27. In giving your opinion on substantial identity and operation of the machine described in the Wells patent and model A, did you assume that Wells was the first inventor of the combination of a feeding-apron, feed-rollers, which you call nipping-
337 rollers, and a picker, with a cap in the rear of the picker, like the cap A in Exhibit A, to disintegrate and cast off from the picker fibrous materials?

A. I did not make that assumption, although he may have been the inventor of that combination.

X 28. Do you know whether or not such a combination is in common use in the manufacture of fibrous materials into articles other than fur?

A. I do not at present remember of such a combination being now in use, although it may be on other fibrous materials
338 than fur.

X 29. What is the usual way of presenting fibrous materials other than fur to a picker?

A. It is by an apron, although the picker which I have in my memory to which they are presented is not an impelling picker, as near as I can recollect. I don't know whether it has feed-rollers or not.

X 30. Do you know how the fur is presented to the picker in the old fur-blowing machine?

A. I do not.

X 31. Did you ever experiment with a machine having
339 two picker cylinders, as in model A?

A. No; but I have seen them in use.

X 32. Did you ever see tried with a machine having the two pickers the experiments which you state in your direct examination you have tried with other machines having one picker-roller?

A. I never saw such experiment with a two picker-roller machine.

X 33. How long have you known of a cap or plate being placed back of a picker to prevent fibrous material fed to the picker
340 being thrown off in the rear of the picker?

A. I believe that in the cotton-devil there is a plate or partition which produces that effect, and I have known of the existence of that machine for many years.

X 34. Do I understand you to have said in this deposition that it is your opinion that in the use of the machine constructed and operated like model A, fur would be thrown out between the
341 upper edge of the plate A and the upper picker?

A. I meant to be so understood, and I base that statement partly upon reasoning on the operation of the parts, and partly on the fact that I saw small quantities of fur passing out in the place you have named in two picker machines in actual operation in the city of Newark during the present year.

X 35. In giving your opinion as to similarity or difference between the operation of model A and the Wells machine, did you consider the cheek-pieces shown in model A essential or
342 material in the formation of such opinion?

A. I did not consider them as essential, although my opinion is, that the entire removal of such cheek-pieces would materially impair or perhaps destroy the operation of the machine. I have never experimented without the cheek-pieces, and supposed them to be of use in preventing hurtful currents of air.

X 36. Suppose those cheek-pieces were entirely removed, and the picker-rollers were supported by an iron post at each end of them, such iron posts being less in diameter than the diameter of
343 the picker-rollers between a machine like model A, with such alterations, and the Wells machine; would your opinion of substantial identity of operation be the same as it is of substantial identity of operation between model A, without such alteration, and the Wells machine?

A. My opinion would be the same, or different, depending upon the effect produced upon the current of impelled fur by such a modification or removal of the cheek of Exhibit A. As stated in my former answer, I do not know with any certainty what that effect would be, but presume it would be somewhat such as
344 stated in the last answer.

X 37. Well, sir, I would like to know whether the model A, modified or altered as specified in the last question, you would consider it an operation substantially the same as the Wells machine, without reference to the manner of feeding?

A. I cannot answer that question without being better informed by experiment than I now am as to the effect of the removal of the cheek-pieces.

345 X 38. If in your statements in your direct examination you did not assume that the cheek-pieces were essential, why can you not give your opinion on the effect of removing them? and also state how such removal would affect your previous opinion.

A. I can't conceive that my want of knowledge as to the effect of removing them has anything to do with the fact of my not naming them as essential in the direct examination, and I have already endeavored , as clearly as I can, why I cannot
346 state how their removal would modify, or not, the opinion given in my direct examination.

X 39. In the opinions expressed, or any of them, in your direct examination, did you assume that those cheek-pieces exerted the necessary influence upon the current of fur?

A. I did not assume that they exerted, or did not exert, an influence upon the current of fur, although my opinion, without experiment, is that they do.

X 40. Would, in your opinion, the removing of those cheek-pieces, and the substitution of the supporting iron bars
347 aforesaid, in your opinion, make an essential alteration in model A?

A. I cannot answer more explicitly on that point than I have already done.

X 41. Can you answer more explicitly, if, instead of the entire removal of the cheeks, they were cut away or reduced until the front edges of them should be even with the front sides of the picker-rollers?

A. My opinion, not based upon experiment, is, that such a cutting away to such an extent would not materially affect
348 the impelled current, and therefore would not materially change the machine.

X 42. From model A how far do you consider a full-size working machine would have the cheeks projecting out in front of the upper picker, and also of the lower picker?

A. Assuming the picker-rollers in model A to represent pickers in a working machine to be thirty inches in length, the projection of the cheeks in front of the surface of the upper picker-roller would be about four inches, and their projection in front of
349 the lower picker-rollers would be about seven inches.

X 43. In your answer to the fourth direct question, you appear to limit yourself to the formation of a bat for a hat body by a combined current of fur and air, in the form of a sheet of proper thickness. Look at model E and then say what brings it to the proper thickness in that machine.

A. The trunk does, before it reaches the cone.

X 43. What do you mean by perforated cone?

A. I mean a cone with holes in it.

350 X 44. Inclusive of wire-cloths, I suppose?

A. Yes.

X 45. At the time you say you experimented and stopped the cone, leaving on the exhaust, do you mean that no fur came in contact with the cone on its side opposite the picker?

A. None of any importance; a few flecks, I believe.

X 46. In that case, how thick did you form the bat or deposit of fur on the side of the cone nearest the picker, at the thickest part?

351 A. Different thicknesses, perhaps a quarter of an inch, when the compression due to the exhaust was removed. I did not pay precise attention to the thickness.

X 47. How large a cone did you employ in that experiment, and how wide at the widest part, and how long was the delivery aperture of the trunk in that experiment at the time it was tried?

A. I made no measurement, but suppose the cone was about two feet him. I picked a machine at random from the sev-

352 eral machines there, on which they were then making hats and made the experiment, without any alteration of the cone or delivery aperture; and as soon as I had done, they went on making bats for hats with the same cone and delivery aperture.

X 48. How many machines did you see in the establishment, and did you see any having the hood at the top of the delivery aperture and the hinged flap at the bottom of the delivery
353 aperture described in the reissued Wells patent?

A. I was only in one room at that time, and did not count the machines in it. There were several of them. I did not notice any hood or hinged flaps. The trunk of the machine I experimented on was like the trunk on "Exhibit B, J. W. N., U. S. Commissioner."

X 49. Did you see any there at work having the two inclined aprons to feed represented in model A?

A. I did not.

354 *Direct resumed by Mr. Keller.*

Q. 50. Would a bat formed on a cylinder, as specified in question 26 on your cross-examination, be suitable for making hat bodies?

A. In my opinion, it would not, and I think I so stated before.

Q. 51. In your answer to Mr. Gifford, in your cross-examination, did you mean to be understood as saying that the machine you saw in operation, having the two picker-rollers arranged like model Exhibit A, had the same proportional projection of
355 the cheeks forward of the front part of the picker-rollers as on the said model A?

A. I did not mean to be understood in that way, and do not think I said so.

HENRY B. RENWICK.

Sworn to before me this 2d October, 1857.

R. E. STILWELL,
U. S. Com.

Closing of the prima facie case.

Plaintiffs' Rebutting Testimony.

Examination of Mr. Rufus Brown, Oct. 22, 1856.

Q. 1. What is your name, age, residence, and occupation?

A. My name is Rufus Brown; I am thirty-four years of age, residing at Palmer, Mass., and am a manufacturer.

Q. 2. Did you ever reside in Ware, Mass.; and if so, from
356 what time to what time?

A. I did, from Aug., 1839, to some time in May, 1843.

Q. 3. Did you have occasion to visit the town of Ware after you removed?

A. I did.

Q. 4. Are you acquainted with Wm. Fosket and Benj. Steadman? and if yea, state when and where you first knew them.

A. I knew them in 1841 and 1842, and in 1843, while living in Ware.

357 Q. 5. Have you any knowledge of Wm. Fosket being engaged in getting up a machine for making hat bodies? and if yea, state when and where, and how you became acquainted with the fact.

A. I have; in 1842 I became acquainted with the fact in Ware; I was associated with him.

Q. 6. Did you have an interest in the said invention?

A. I had.

Q. 7. When did you acquire that interest?

A. I think it was in the spring of 1842.

358 Q. 8. When was the construction of the machine commenced?

A. I think in the spring of 1842.

Q. 9. State as nearly as you can remember when the machine was first sufficiently advanced to attempt to make a hat body upon it.

A. I think in the last of the summer, or the fore part of the fall in 1842.

Q. 10. When did you last see that machine work?

A. I believe in May, 1843.

359 Q. 11. Were you acquainted with the progress of that machine, and the experiments made on it, from the time of its commencement to the last time you saw it work in May, 1843?

A. I was.

Q. 12. During the whole time of your acquaintance with that machine, what was the result of the attempt to work it, successful or otherwise?

A. So far as my knowledge, it was otherwise.

Q. 13. Do you know if Benj. Steadman was at any time,
360 and if yea, during what time, interested in or connected with the construction and working of the said machine?

A. In the fore part of the year 1843 he was constructing and experimenting.

Q. 14. Do you know if his interest in, or connection with that machine continued up to the time you last saw it work?

A. He disposed of his interest before the last time I saw it work.

Q. 15. What was the character of the best hat body which
361 you have seen made upon that machine, as regards quality?

A. They were uneven, with thin places in them.

Q. 16. Did you ever see any one of the name of Washford, a hatter, working on any of the bodies made on that machine?

A. I have.

Q. 17. What was his given name?

A. I don't know his name.

Q. 18. Did you see him harden any hat bodies made on
362 that machine?

A. I did; he was hardening.

Q. 19. State what took place at the time you last saw him hardening such bodies; and if he said anything on the subject, state what occasioned such remark.

(Question objected to as calling for hearsay testimony, and request the witness not to state anything which he heard.)

A. I took up a body, and remarked it to be very fine; he took it, opened it, and putting his hands in it, said: look here; holding it up to the light, he showed me imperfections. I remarked
363 that it was good for nothing, or something to that amount; he said that he could fix them up well.

Q. 20. Do you know what became of that machine?

A. I do not.

Q. 21. When did you return to Ware after moving from there in May, 1843?

A. I visited Ware in November following.

364 Q. 22. Was this machine then in use?

A. Not to my knowledge.

Q. 23. Did you then have an interest in it?

A. I did.

Q. 24. Did you make any inquiries as to what had become of that machine; or have you any means of knowing what did become of it at that time?

(Answer to question objected to.)

A. Of my own knowledge I have not, but I understand it was abandoned. I understood it was given up. I have since
365 seen some of the remains of that machine about Ware two years ago.

Q. 25. Do you know whether any settlement was made between the firm of which you were a member and Wm. Fosket, between the month of May and the time you returned to Ware in November, 1843? and if yea, state what such settlement was, and how it was.

A. There was a settlement made between May and November. I know it by a mortgage given by Fosket to the firm of
366 which I was a member, dated August, 1843, to the best of my recollection.

Q. 26. Was Fosket in Ware at the time of your visit in Nov., 1843?

A. Not to my knowledge.

Q. 27. Have you parted with the interests you had in the Fosket invention; and if so, when and to whom?

A. I have. I made an assignment of my interest to Mr. Cow-

perthwaite, as near as I can recollect, about the first of December, 1856.

Q. 28. At whose instance did you make that assignment
367 to George E. Cowperthwaite?

A. At the instance of one Taylor. I can't tell his given name.

Q. 29. Look at the paper marked Exhibit X, and state what it is, and whether it enables you to fix the name of the party at whose instance you made the assignment to Cowperthwaite, and the exact date at which such assignment was made.

A. That is not the assignment I made to Cowperthwaite, but the bond that Cowperthwaite gave me on the day I made
368 the assignment; it enables me to fix the name of the party who did; his name was Alva B. Taylor; the assignment was made on the 10th day of Dec., 1856.

Q. 30. With whom did you bargain for the sale of your interest?

A. It was Alva B. Taylor.

Q. 31. State all the circumstances which led to the assignment to Cowperthwaite.

A. We went, as I supposed, to make the assignment to Mr. Taylor; I directed the attorney to make it to Mr. Taylor.
369 Taylor says, No, make it to Mr. Cowperthwaite. I said, How is that? He said, It will make no difference to you; I will sign the bond.

Q. 32. During your interview with the said Taylor and Cowperthwaite did you learn anything, and if so, what, about the ownership of the machine or machines for forming hat bodies, which was or were in operation at Danbury, in the name of Cowperthwaite?

(Question objected to.)

A. I understood that it was Mr. Taylor's machine, and
370 that Mr. Cowperthwaite had been operating on it.

(Answer objected to.)

Q. 33. Did they express to you what their object was in acquiring your interest in the Foskét patent? and if yea, state what was such object.

(Question objected to.)

A. To avail themselves of everything they could which was in the Fosket patent, to prevent parties obtaining an injunction to the use of their machine; it was to be used on a trial.

371 Q. 34. Did you ever, and if so about when, have a conversation in the town of Palmer, State of Massachusetts, with Benjamin Stedman, in relation to a machine for forming hat bodies in the city of New York? and if yea, state in substance what he said to you on that subject.

A. I think in the summer of 1845 I saw Benjamin Stedman, in Palmer. He said there was a machine for forming hat bodies in

the city of New York, which he thought was an infringement of the Fosket patent.

Q. 35. Did he state whether he had seen that machine?

372 (Objected to.)

A. I understood him that he had.

Cross examined by Mr. Harding.

X 36. When were you first spoken to by or on behalf of the complainants in this case, with a view of giving testimony in this case?

A. I think on or about the time I assigned the bond to I. D. Condit.

X 37. Is this the assignment of the bond now shown you,

373 and which is annexed and forms a part of Exhibit X, and what date does it bear?

A. It is the assignment of the bond, and is dated 28th day of August, 1857.

X 38. Who negotiated this assignment with you?

A. Daniel Barnum, Esq.

X 39. Did you ever see Israel D. Condit, and when first?

A. I saw him to-day for the first time.

X 40. Whom did Daniel Barnum represent, and what

374 passed at the time above named by you?

A. Himself; he requested me to assign this to Israel D. Condit.

X 41. You have said that you were spoken to about that time as to giving testimony on behalf of these complainants; what passed between you in reference to that point?

A. I said that it could not be expected of me to testify in a case that would prejudice my interest. Mr. Barnum said if he

375 bought my interest there certainly could be no objections. I then made the assignment to Mr. Condit, and he paid me $500 for it. It was paid by check. It was signed by H. A. Burr.

X 42. What then?

A. Mr. Barnum then said that he thought he should like to use my testimony in a case against these other parties.

X 43. When you assigned your interest to Cowperthwaite in 1856, what price did you fix?

A. I fixed no price.

X 44. What did you say on the subject of price?

376 A. I accepted of the price fixed by Mr. Taylor.

X 45. What amount of money did you contribute to introduce or aid Mr. Fosket in introducing or completing his machine?

A. I am unable to state. I contributed various amounts; I should think, within bounds, over a hundred dollars, at the time

these experiments were going on, previous to May, 1843. The mortgage was given to the firm of which I was member, for a part of this money, which was paid out to him by the firm of
377 which I was a member; and he mortgaged his tools to secure this debt to the firm. We afterwards allowed him to remove his tools out of the State.

X 46. At whose suggestion was the mortgage on his tools given?

A. I do not know. I was absent at the time the mortgage was given.

X 47. Did you contribute, or offer to contribute, any money after May, 1843?

A. I did not.

X 48. What was Mr. Fosket's condition in a pecuniary
378 point of view?

A. He was poor, and left Ware in debt.

X 49. Did you think that Mr. Barnum paid you a good price at the time he told you the complainants wanted to use your testimony in this case?

A. He bought this bond of me, and paid me what I asked.

X 50. Did you not think it was a good business operation on your part?

A. I did.

379 X 51. Who else besides Washburn used those bats of Fosket's, to make bodies, prior to 1843?

A. I know of no one, except Tollman, who wished some bodies.

X 52. Did you know of some being sent to Boston?

A. Of my own knowledge, I know not. I believe there was some sent to Boston, and sold to one Whitman.

X 53. Have you not heard it stated that workmen were opposed to the introduction of machines for making hat bodies?

380 (Objected to as calling for hearsay testimony.)

A. I have heard it, and so stated.

X 54. Did you not say that this was one thing which interfered with the introduction of Fosket's machine?

A. I presume I have.

X 55. Why do you presume so?

A. This was discussed at the time the machine was being experimented upon; it was generally understood by the parties that hatters combined against the use of bodies made by any ma-
381 chinery; this was generally understood by the parties connected with this machine at the time.

X 56. Have you ever seen or worn hats which have been made from hat bodies which have been made on this machine?

A. I have never known one. I have seen one that was said to

be made on the machine. I believe it was made on this machine, but did not see it made myself.

X 57. Was it a good hat?

A. It looked well. I suppose that Mr. Washburn made it. A man by the name of Hancock wore it.

382 X 58. Did they not make a good many bodies on this machine?

A. There was few formed that went into use. We experimented a little every day from the time we commenced up to the time I left Ware. A great many were formed, but very few went into use.

X 59. Why was that?

A. The mass that we formed were very imperfect, as it is with all original experiments.

X 60. In those hats, how was the fur in thickness, at
383 the brim and tip?

A. The great trouble with the bodies, they were cloudy, thick and thin in places. We made them thicker at the brim-turn, and also at the crown. We made them thicker where the brim turns, and also where they turn for the crown.

X 61. Was it the desire of hatters to have them made in that way?

A. It was the instruction of Washburn, the hatter, to have them done so.

384 X 62. What was the extent of your interest?

A. I do not positively know. The last impression I derived from Fosket was, that it was three-quarters. There was a doubt about that at the time Mr. Taylor and Cowperthwaite were at Palmer; at that time it was thought that Joseph A. Brown had an interest.

Re-direct resumed.

Q. 63. At the time you made the transfer to Cowperthwaite
385 did you act for and transfer your own interest alone, or yours and Joseph A. Brown's?

A. I conveyed to them all the interest I had in the patent. Mr. Cowperthwaite was anxious to perfect the title. I obtained from Joseph A. Brown a writing, I think, confirming for himself what I had done.

Q. 64. Did that bond cover the consideration for Joseph A. Brown's interest as well as your own, or was there any other consideration given at the time?

A. Not that I know of.

Q. 65. When, and under what circumstances, did Joseph
386 A. Brown acquire his interest?

A. I understood he acquired his interest from Mr. Lyon and Mr. Phelps, if he had any, but don't know where or when. I think it was before letters-patent were issued.

(Answer objected to as hearsay evidence.)

Q. 66. Did you know of his having any such interest prior to the summer or fall of 1845?

A. I think he had an interest a few months before letters patent were taken.

387 (Answer objected to.)

Q. 67. At the time of leaving the town of Ware, were your circumstances and means such as to have enabled you to go into the manufacture of hats by the said Fosket machine?

A. I don't know. If the machine could have been perfected, I had means; but this depended upon how much it would take to perfect the machine.

Q. 68. Do you know if Tollman got any hat bodies made on the Fosket machine which had not been hardened by Washburn?

388 A. I think not; he was the practical hatter, and had the general handling of the bodies.

(Objected to.)

Q. 69. Do you know of your own knowledge that hatters were opposed to the use of hat bodies made by machinery?

A. I do not. I never tried to induce hatters to use them.

Q. 70 Were the parties in interest deterred from the prosecution of their experiments with the said Fosket machine by the fear that hatters would not use the bodies made on it?

389 (Objected to.)

A. I do not know that they were.

Q. 71. You have stated on your cross-examination, that you have seen one hat worn which was said to have been made on the Fosket machine. Do you know what was the condition of the body of that hat after it was formed on the machine and before it was hardened and made into a hat?

A. I do not.

Q. 72. How do you know that some bodies were sent to

390 Whitman, of Boston?

A. I know from Anson Phelps.

Q. 73. Did Anson Phelps have an interest in the invention at that time?

A. He did.

Q. 74. Was the amount paid to you by Barnum in any manner given directly or indirectly as an inducement for your testifying in this case?

A. It was not.

Q. 75. Was there any understanding of any kind be-

391 tween you and Barnum, or between you and any one else,

as to what you would testify to, or that you would testify at all in this or any other case, before the sale was made and the transfer executed to Condit?

(Objected to as leading, and because the witness has already stated that he declined to testify against his own interest in this case, whereupon Barnum bought his interest and paid him $500.)

A. I refused to tell about this machine as long as I had an interest in it. There was no understanding between Mr.
392 Barnum and myself as to what I would testify to in relation to this patent, or experiment. I refused to testify, and there was no understanding between myself and any one else, that I would testify.

WEDNESDAY, *October* 21, 1857.

Counsel on both sides present.

Testimony on the part of the complainants resumed.

Harvey Waters recalled.

393 Plaintiffs' counsel, before proceeding to the examination of witnesses, gives notice to defendants' counsel that plaintiffs desire to have the privilege of access to the Fosket machine named in the defendants' testimony, for the purpose of examination and experiment by themselves, their counsel, and witnesses.

Mr. Gifford, counsel for the defendants, answer, that plaintiffs' counsel, together with his witnesses and the plaintiffs, shall be at liberty to be present and examine and witness the operation of the said Fosket machine, the same being operated by and un-
394 der the care of the men accustomed to use it, and all in the presence of the defendants and their counsel, and such other persons as the defendants shall elect to have present, and this examination and inspection may be had as soon as the persons accustomed to use the machine can be got to New York, which will be to-morrow, or the day after to-morrow at the furthest; and in addition to the above, if the plaintiffs, or their counsel, or their witnesses, desire sooner to see the Fosket machine, not in operation, but standing in form ready to operate, they shall be
395 at liberty, if they choose, to accompany the defendant and his counsel, and such other persons as he shall elect, to go with them to see that machine.

The plaintiffs' counsel gives notice to the defendants' counsel that he will accept the above proposition, with the amendment, that the persons accustomed to working the said machine shall make such experiments with the said machine, and the working of the same, as the plaintiffs, or either of them, or their counsel or witnesses, may desire.

The defendant does not feel that it is his duty in law or
396 equity to lend out his machine to be experimented upon out of its usual course of operation, and particularly when the

plaintiffs had access to the patent, and for some years have known of this patent, and might therefore have prepared their own apparatus for experiment.

Plaintiffs' counsel replies that he is unable to see that the offer of the defendants' counsel would be of any use restricted as it is, as the object of the request made by the plaintiffs' counsel was to enable the plaintiffs to test the said machine with a view to develop its practical working capacity, and such test, in the judgment of the complainants' counsel, cannot be made if the course of
397 experiments is to be entirely under the control of the defendants and their employees.

Q. 1. Have you examined the description and drawings in the English patent granted to Thomas Robinson Williams, and published in the tenth volume of the London Journal of Arts and Sciences, conjoined series, commencing on page 73, and ending on page 79, and a certified copy of an application for letters-patent of the United States by the said Williams, which said appli-
398 cation was patented on the 24th day of April, 1840, and the description and drawings making part thereof, including the cancelled portions of the said description and drawings? and if yea, state whether, in your opinion, the machines therein described and represented are substantially different in principle or mode of operation from the machine of Wells described in the reissue of the Wells patent of Sept. 30, 1856, referred to by you in your former examination, or from the machine of the defendants here present, or model No. 1, and give the reasons fully for
399 such opinions as you shall express.

A. I have examined the description and drawings of the English patent referred to, also the certified copy of an application for letters-patent of the United States to the said Williams, referred to in the question, including the cancelled portions of the said description and drawings, and I do not find therein contained any description of a machine substantially, in principle or mode of operation, like the machine of Wells referred to in the question, and the machine of the defendants referred to in the question or model No. 1. The main part of the machines described
400 by Williams are for the purpose of manufacturing what he calls artificial skins, (somewhat similar to what is now known as papier-mache,) where the fibrous material is held together by some glutinous substance in contradistinction to felting. But he gives a description in the English patent, and in the application for an American patent, of a machine for forming hat bodies on a perforated cone. That machine differs from the Wells machine, and from the defendants' machine, and from model No. 1, in some essential particulars. There is no suitable disin-
401 tegrating apparatus in the Williams machine, nor any suitable manner provided for controlling the cast of the fur

upon the cone. The apparatus for blowing out the fur is merely a fan blowing it quite at large into the atmosphere, and not in the form of a sheet, so that in my judgment it would not be practical to form good hat bodies on the cone, for the reason that the distribution in the direction of the length of the cone could not be accomplished with any practical certainty. Moreover much of the fur would be likely to go to waste by falling otherwise than on the cone.

402 Q. 2. In the description of the said Williams application for an American patent, after describing a machine for making continuous bats, and in the cancelled portion of the said description, I find the following passage preceding the description of the machine for forming hat bodies, namely:

"For the manufacture of hat bodies and other irregular forms, I generally use the following arrangement of machinery and process, first remarking that it will be evident the fibrous materials may be deposited upon, and consequently take the form (whatever that may be) of various woven wire gauze, or perforated shapes
403 or plates; for as the materials are mixed with or suspended in the air, and are only arrested or stopped by the said wire gauze or perforated shapes or plates, the materials will be drawn upon and deposited over all parts of the same through which the current of air is allowed to pass. Therefore any other form may be placed in the situation of the cylinder i, but in this case it is not necessary to enclose the forms in casing, as shown in the preceding figures, and the delivery rollers k k are not required."

Then follows the description of a machine for making hat
404 bodies or foundations by reference to figure 6 of the drawings.

Will you state whether you find any description or representation in the said application, of the manner in which a perforated cone could be substituted for the cylinder i, to constitute a practical machine for forming had bodies? and if yea, state what such description is, and point out on the model No. 7 how a machine would be organized for such purpose.

A. I do not find in the description referred to, any manner in which a perforated cone could be substituted for a cylinder
405 to constitute a practical machine for forming hat bodies.

Q. 3. If a cone were substituted for the cylinder in model No. 7, and the surrounding case removed, please to state in what manner the currents induced by the exhausting-fan would act on the fur fibres.

A. I am sure I cannot tell that, except to draw them down to the fan.

Q. 4. What would be the effect of the exhaust current on the fur fibres deposited on a cone if substituted for the cylinder

406 i, in model No. 7, if such cone were incased as the cylinder is incased?

A. The same as on the cylinder; it would hold them on the cone in all that portion of its surface above the lower casing, and take them off in all that portion of its surface connected with the exhaust by means of the lower casing, if the rollers k k were not.

Q. 5. If the cone were substituted for the cylinder without the surrounding casing, would the currents induced by the
407 exhaust hold the fur fibres to the entire surface of the cone?

A. No.

Q. 6. Why not?

A. Because there would be no pressure of the atmosphere upon the whole surface of the cone greater on one side than the other.

Q. 7. What do you mean by one side or the other?

A. I mean greater upon the outside than the inside.

Q. 8. In the Williams machine for forming hat bodies as represented in figure 6 of the drawings, both in the English pa-
408 tent and in the American application, in what direction relatively to the axis of the cone will be the width of the sheet of fur fibres if thrown by the fan when it approaches the cone, parallel therewith or at right angles thereto?

A. It don't appear to me that the volume of fur will approach the cone in its immediate neighborhood in the form of a sheet, but rather in a shower: if it maintains the form of a sheet in its passage from the blower to the cone, the width of the sheet will cross the axis of the cone at right angles thereto.

409 Q. 9. Why does it appear to you the fur will not approach the cone in the form of a sheet?

A. Because that a fan cased as represented in the drawing, and revolving in the direction represented, would be likely to expand the sheet in its thickness, so as to be equal, or nearly equal, to the breadth of the machine.

Q. 10. Have you examined the letters patent granted to Thomas Blanchard, dated June 14, 1837, for improvement in batting or web for hat bodies? and if yea, state whether the machine
410 therein described and represented is substantially the same, or different in principle or mode of operation from the Wells machine before referred to, or the defendants' machine before referred to?

A. I have examined the patent referred to, and find the machine therein described substantially different in its mode of operation from the Wells machine and the defendants' machine referred to.

Q. 11. Do you find that either of the Williams machines before referred to in your testimony, or the Blanchard machine referred to in the last question, contains a combination or arrange-

411 ment of machinery by which fur fibres can be thrown against a section of the circumference of a perforated cone or other form, as the same is rotated to present in succession every part of the circumference thereof to the current of impelled fur, when this is combined with the holding of the fibres on to the cone during the operation by the pressure of the surrounding atmosphere, induced by exhausting the air from within such perforated cone?

(Question objected to as leading.)

A. No.

412 Q. 12. Do you find that either of the Williams machines, or the Blanchard machine, referred to in the last question, is substantially like or substantially different from the Wells machine or the defendants' machine before referred to, as you have defined the said Wells and the said defendants' machines to be in your examination?

(Question objected to by defendants' counsel as leading.)

A. I find them all to be substantially different.

Q. 13. Have you examined letters patent granted to Wells, James and Peck, on the 22d of Sept., 1837, for improve-
413 ment in the mode of making a batting or web? and if yea, state whether the machine therein described is substantially like or substantially different in mechanical combination and mode of operation from the machine described in the reissue of the Wells patent, dated Sept. 30, 1856, or from the defendants' machine.

A. I have, and find the machines substantially different.

Q. 14. Have you examined letters patent granted to Hezekiah S. Miller, on the 5th of March, 1839, for improvement in machines for making felt fabrics? and if yea, state whether the ma-
414 chine therein described is substantially like or substantially different in mechanical combination and mode of operation from the machine described in the reissue of the Wells patent, dated Sept. 30, 1856, or from the defendants' machine.

A. I have, and find the machines substantially different.

Q. 15. Have you examined the description of an English patent granted to H. A. Wells, and published in the London Journal of Arts and Sciences, vol. xiii, conjoined series, beginning at
415 page 191? and if yea, state whether the machine therein described and represented is substantially like or substantially different in mechanical combination and mode of operation from the machine described in the Wells reissue of Sept. 30, 1856, or from the defendants' machines.

A. I have examined the description referred to, and find the machine substantially different from the Wells machine and the defendants' machine.

Q. 16. Have you examined the specification and drawings
416 of letters patent granted to William Fosket on the 23d of

January, 1846, for improvement in machinery for making hat bodies? and if yea, state in what particulars the machine therein described corresponds with, or differs from, the machine of Wells described in the reissued patent of Sept. 30, 1856.

A. I have examined the patent referred to, and find that the machine therein described corresponds with the Wells machine in having a feed-table, feed-rollers, and perforated rotating exhausted cone, but it differs from the Wells machine in using a bow-
417 string for the disintegration of the fur instead of a fan-brush, and in being altogether unprovided with any means of generating a current of air and propelling the fur therein or upon, as is done in the Wells machine by the fan-brush, the Fosket machine having no propelled current except such as is induced by the exhaust of the cone; it also differs from the Wells machine in being provided with conical rollers to operate upon the exhausted cone while the bat is being formed thereon, and in being wholly unprovided with any suitable means for regulating the deposit
418 of fur in the direction of the length of the cone, which regulation is performed in the Wells machine by means of a trunk with a suitable delivering orifice, having its greatest dimension parallel to the axis of the cone, and acting with that delivering orifice a hinged hood, or other equivalent device, for the further modification and proper regulation of the deposit of the impelled fur upon the perforated cone.

Q. 17. State whether and in what respect the said Fosket machine resembles or differs from the defendants' machine.

419 A. It resembles the defendants' machine in having a feed-table and feed-rollers, also in having a perforated rotating exhausted cone; it differs from the defendants' machine in having a bowstring for the disintegration of the fur, instead of two disintegrating picking and blowing cylinders; it also differs from the defendants' machine in having no impelled current upon which or into which the fur is thrown, which impelled current is produced by the joint action of the two picking cylinders in a tangent common to both in the defendants' machine, while in the Fosket machine the current which receives the fur is generated by the
420 exhaust alone. Moreover, the current which receives the fur and takes it forward to the cone has its greatest dimensions at right angles to the axis of the cone, while in the defendants' machine the current which receives the fur has its greatest dimensions parallel to the axis of the cone, and maintains that parallelism in all the travel of the fur (when the sheet is once formed) until the fur is deposited upon a section of the revolving perforated cone, thus enabling the operator to deposit the fur in properly regulated quantities in the direction of the length of the cone,
421 upon a section thereof, by means of feeding the fur upon the apron of the machine in greater quantities over against that

portion of the length of the cone where he wishes to deposit the greatest thickness, and less against that portion where he wishes to deposit the less thickness, which regulation cannot be accomplished in a Fosket machine by the variable feeding, because the sheet of fur, while it remains a sheet, has its greatest dimensions in section at right angles to the axis of the cone. In the
422 Fosket machine conical rollers are used upon the cone while the bat is being formed thereon, which rollers in the defendants' machine are dispensed with while the bat is being formed.

Q. 18. Are the differences which you have pointed out between the Fosket machine and the machine of Wells and of the defendants, substantial or formal?

A. Substantial.

Q. 19. Examine the drawings Exhibits 10 and 11 on the part of defendants, and state what would be the direction of the
423 tangent common to the two picker-rollers relatively to the axis of the cone, when produced to that distance, if the upper picker-roller were thrown as far forward as the segment slots in the two heads would permit.

A. I can't answer that question exactly. I think it would be slightly below the axis of the cone; it is now slightly above. The slots are long enough to admit of such an adjustment as that the tangent common to the two cylinders would strike the axis of the cone when so produced; there would be no difficulty in answering the question with the use of the rule and compass.

424 Q. 20. Assuming the upper picker in the defendants' machine to be set so far forward that the tangent common to both pickers, if produced to the required distance, would pass through the axis of the cone, in what direction would the sheet of fur travel, and upon what part of the surface of the cone would it impinge?

A. It would travel in the direction towards the axis of the cone, and impinge upon the cone on that portion of its surface for the time being mainly between the axis of the cone and the two picking cylinders.

425 Q. 21. What would be the effect of the impingement of the depositing fibres upon the previously deposited fibres, if the current of fur fibres travel towards the cone in the direction stated in your last answer?

A. Not much, as the inertia of the depositing fur is small. Such as it is, and what there is of it, would tend to press the fur already deposited more closely upon the cone.

Q. 22. Have you examined letters patent granted to Stephen Hurlbut on the 13th day of June, 1831, for an improve-
426 ment in the manufacture of hats, by hardening the body on the cone? and if yea, state whether the invention therein described is substantially like, or substantially different, from the

invention described in the reissue of the Wells patent of the 7th of October, 1856, and give your reasons fully for such opinions as you shall express.

A. I have examined the patent referred to, and find the invention therein described substantially different from the invention described in the Wells patent, because the cone in the Hurlbut patent has no exhaust, but the bat is wound upon the cone,
427 in consequence of which the cone may be removed from the machine with the bat upon it, without any further hardening after the winding, and without, by such removal, endangering the bat thus constructed upon the cone, while in the Wells invention the bat cannot be removed from the machine without endangering the bat as there formed of fur fibres, unless there be something placed over the same to retain the fur in its position upon the cone when the cone is removed from the exhaust.

Q. 23. Will you state whether you find in the description in the Williams application for the American patent of 1840, be-
428 fore referred to, any description of a mode of hardening a bat of fur fibres formed upon the exhausted cone for the purpose of being afterwards felted?

A. I do not.

Q. 24. I find it stated in the specification referred to in the last question, that "when sufficient quantity of the fibrous material has been deposited upon one shape or form, another shape, made in two halves, (when its form requires it,) as that shown at figure 7. is placed over the material and the inner form, and the
429 whole removed together and dipped into the adhesive composition (generally of weak size, or a solution of shellac,) which saturates it; the material thus combined is taken from the forms and dried." Calling your attention to the passage above quoted, and to the forms represented by figure 7 of the drawing, please state whether the forms of bats saturated in such adhesive mixture are to be afterwards felted.

(Question objected to.)

430 A. They are not.

Q. 25. Will you state your reasons for your answer to the last question?

A. Because the procedure there referred to belongs to that class of manufactures which goes to the making of shapes of what the patentee calls artificial skins, which are somewhat analogous to papier-mache, as I have before stated in this examination, and because, when so formed and dried, they could not be felted for any practical purpose, or to any practical end.

431 Q. 26. Do you find in the Blanchard patent, before referred to in your examination, any description of a process of hardening a bat when formed on an exhausted cone?

A. No.

Q. 27. Calling your attention to the patent granted to Wells, James & Peck, dated Sept. 20, 1837, and the patent granted to Wells in England, published in the London Journal of Arts and Sciences, vol. 13, conjoint series, page 191, etc., please state in what respect the mode of forming the hat body, and pre-
432 paring it to be removed from the cone described in the said patents, corresponds with or differs from the invention described in the reissue of the Wells patent of Oct. 7, 1856, and give your reasons fully for your opinion.

A. In both the patents first referred to, the fur is first formed into a web, or sliver, and afterwards wound up on a cone which has no exhaust, so that the cone with the wound bat upon it may be removed from the machine, on which it is formed, safely, without any previous hardening, while in the Wells invention
433 last referred to in the question, the bat is formed of fur fibres on a cone having an exhaust, and from which exhaust the cone cannot be safely taken with the bat upon it unless it be partially hardened before the removal of the cone from the exhaust, or have something wound or placed upon it to keep it in its place upon the cone when removed from the exhaust.

Q. 28. Will you state whether you find in the Fosket patent, before referred to, any, and if so, what practical mode of hardening the bat formed upon the exhausted cone?

434 A. I don't find any practical mode.

Q. 29. What is the motion, or motions, described as being imparted to the roller, or rollers, applied to make pressure on the bat as the fur is being deposited upon the cone in the Fosket machine, as the same is described and represented in the Fosket patent before referred to?

A. They simply revolve upon their axes, driven by the motion of the cone, and the fur intervening between the rollers and the cone.

Q. 30. What is the effect which they are described as
435 producing upon the bat?

A. They press upon it.

Q. 31. Will you state whether such rolling pressure would have the effect of hardening or felting the bat as the term is understood among hatters or manufacturers of felt?

A. I think not; it might tend to interlock the fibres slightly on the straight part of the cone, but would not harden it considerably even in that part, while all that portion of the cone converging from a straight line on its surface to the tip would be left the same as if no rollers were used.

436 Q. 32. What mode, if any, do you find described in the Fosket patent for varying the thickness of the bat from brim to tip?

A. Not any.

Cross-examination by Mr. Harding.

X 33. What experience have you had as a practical hatter?

A. None.

X 34. What practical acquaintance have you had with
437 hat body machines?

A. I have often witnessed the operation of the Wells machine, making examinations for the purpose of understanding its peculiar mode of operation.

X 35. When and where first did you see the operation of the Wells machine?

A. In the city of Philadelphia several years ago; cannot remember the precise year; I should think about seven years ago.

438 X 36. Was the machine which you then saw constructed like the description annexed to the Wells reissued patent of Sept. 30, 1856?

A. Substantially the same, although I think it had simple feeding rollers, and no hinged hood.

X 37. Did you ever see a machine for making hat bodies with a hinged hood such as described in Wells' reissued patent aforesaid in operation; and if so, when and where?

A. I don't remember that I ever did.

439 X 38. How was the fur regulated or controlled in its deposit on the cone in that machine which you first saw?

A. By the form and position of the delivering orifice of the trunk, as well as I remember.

X 39. How then did you become informed as to the principle or mode of operation of the machines described in the Wells reissued patent aforesaid?

A. By the description contained in the patent in connection with my knowledge of how a current of air would act under
440 the circumstances of the parts described in that patent.

X 40. When did you first become acquainted with the principle and mode of operation of the Wells machine as described in reissued patent Sept. 30, 1856?

A. About seven years ago, as well as I remember.

X 41. How many times have you been called upon as a witness to explain the principles and mode of operation of that machine?

A. I can't say definitely; perhaps from six to eight times.

441 X 42. When did you first have occasion to investigate the machines or patents about which you have been interrogated in this case, for the purpose of analyzing them or comparing them with the Wells invention?

A. Some of them seven years ago, or thereabouts; others at subsequent dates, and some of them I have seen in this case for the first time.

X 43. Is there any element in the Wells machine which is not to be found in some one of the machines to which you have been referred in your examination in chief?

442 A. Yes; I understand the question to ask whether some one of all the machines does not in itself contain all the elements contained in the Wells machine.

X 44. Please specify the mechanical elements which constitute the combination exhibited in the Wells machine.

A. A feed-table, feed-rollers, a disintegrating and blowing apparatus, a guiding trunk, with a hood, a rotating exhausted cone in front of the delivering orifice, and with its axis parallel with the greater dimension thereof.

X 45. How many distinct and elementary devices are con-

443 tained in your last answer?

A. I believe there are seven.

X 46. Do you believe that the Wells machine was the first machine which contained those seven elements in combination?

A. Yes.

X 47. Did a feed-table exist in previous machines?

A. Yes.

X 48. Did feed-rollers exist in previous machines?

A. Yes.

444 X 49. Did a disentegrating and blowing apparatus exist in any previous machines?

A. Yes.

X 50. Did a guiding trunk exist in any previous machine?

A. Yes, but not such a guiding trunk as makes one of the elements of Wells' machine.

X 51. Did a hinged hood exist in any previous machines?

A. No, nor any other hood.

445 X 52. Did a rotating exhausted cone exist in any previous machine?

A. Yes.

X 53. Define what you understand by a device in mechanics?

A. That depends a good deal upon what I am talking about. Sometimes a screw is a device, sometimes a brace, sometimes a gear; but as all these minor devices enter more or less into the construction of every machine, or nearly every machine, I do

446 not find it practical to speak of them as devices in an organization unless they constitute essential elements entering into the mode of operation of the peculiar contrivance under consideration; I think it better to consider the elements rather more in the aggregate as devices well known to machinists, having a character and purpose peculiar in the construction of organisms.

X 54. Does each one of the seven devices mentioned in your 44th answer perform a specific function?

A. No.

447 X 55. Which one does not?

A. The hood.

X 56. Does each of the other six devices perform a specific function?

A. No.

X 57. Which one does not?

A. The guiding trunk.

X 58. Does each of the other five perform a specific function?

A. I believe so.

448 X 59. Does the hood perform no function?

A. No.

X 60. What function or functions does the hood perform?

A. It serves to modify the delivering orifice of the trunk, or the current issuing therefrom, so as to distribute the fur in properly regulated quantities on a section of the exhausted cone.

X 61. Is that the specific function of the hood?

A. No, it has no specific function, but a function in concert with a trunk, so that both together shall vary the distribution of

449 the impelled fur upon a section of the cone.

X 62. Does the trunk perform any function or functions?

A. Yes.

X 63. What is that function or functions?

A. It acts in concert with the hood for guiding the fur and distributing it in properly regulated quantities upon a section of the cone, and as described and represented specifically in the Wells patent; it serves per se to change the sheet of impelled fur,

450 so that its greatest breadth shall be in the direction parallel to the axis of the cone when issuing from the delivering orifice, whereas its greatest breadth is at right angles to the axis of the cone where it issues from the disintegrating and blowing apparatus.

X 64. What specific function does the feed-table perform?

A. It carries the fur to the feed-rollers.

X 65. What specific function do the feed-rollers perform?

451 A. Carry and present the fur and hold it properly to the disintegrating apparatus.

X 66. What function does the disintegrating apparatus perform?

A. It disintegrates the fur and throws it off in a tangent.

X 67. What specific function does the blowing apparatus perform?

A. It generates a current of air into which, or upon which, the fur is thrown by the disintegrating apparatus.

X 68. What specific function does the rotating exhausted

452 cone perform?

A. It arrests the impelled fur and gives form to the bat by its outer surface, while the exhaust makes a partial vacuum

within it, so that the prevailing pressure of the atmosphere upon the outer surface shall maintain the fibres of fur in their position.

X 69. In the sense in which you think it better to use the term device as mentioned in your 53d answer, please state whether you find any other devices mentioned in the Wells reissued
453 patent of Sept. 30, 1856, as constituting an essential part of his machine.

A. I don't now think of any other, unless it be a device to place the cone in front of the delivery aperture of the trunk, [so that the fur may be thrown] so that its axis shall be parallel with the breadth, in the greatest dimension of the delivering orifice.

X 70. Is not that device mentioned by you in your former specification of devices?

A. I did mention it in the specification, but did not enu-
454 merate it as one of the seven devices.

X 71. If that be a device, it would constitute an eighth device, as existing in the Wells machine?

A. Yes.

Cross-examination of Harvey Waters continued, 22d Oct., 1857.

X 72. What is the specific function of this eighth device?

A. If it has a specific function, it is to distribute the fur
455 in properly regulated quantities on a section of the cone, so as to give the desired variation of thickness from the brim to the tip of the bat; that is its principal function and purpose.

X 73. Which one of these eight devices which you say constitute the Wells machine of Sept. 30, 1856, could be rejected from the machine without affecting its character and capacity?

A. In the specific construction described by Wells, I don't think that any of them could be well dispensed with.

456 X 74. Of these eight devices do you not consider the trunk with its hinged hood to be the novel feature upon which the success of the Wells machine mainly depends?

A. Yes; as that machine was constructed by Wells, and as described in the letters patent, having in view what went before it in the arts, I think it was due to the use of that trunk, with the hinged hood, whereby, that is, with the trunk and hood, he was enabled to direct the current of impelled fur and regulate it in the direction of the length of the cone, that he succeeded, be-
457 cause I consider the other inventions for forming a bat of fur fibres upon a perforated cone previous to this invention, as practical failures, for the want of some practical means of controlling the deposit of fur in the direction of the length of the cone.

X 75. Have not some or all of the machines which preceded Wells' the means of generating a current of air to waft the fur or other fibrous material to the neighborhood of the wire vellum or perforated cone, (as the case may be)?

A. Yes.

X 76. Have they not some, or all, also the exhaust or par-
458 tial vacuum, by which means the current of air wafting the fur is further induced?

A. Yes.

X 77. Was not this the case with the Fosket and Blanchard machines?

A. No; the Fosket machine has not; the Blanchard machine has.

X 78. Did you not make an affidavit in the case of St. John & others, against Gill & others, in the U. S. district court, district of Massachusetts, on behalf of complainant?

459 A. I think I did.

X 79. Did you not say in said affidavit that "you were acquainted with the machine described by and patented to William Fosket on the 23d day of January, 1846, a certified copy of which is now before me; both Blanchard's and Fosket's machines I understand to have preceded the Wells machine, and with this understanding, this deponent further says that he believes the success of the Wells machine depends mainly upon the novel feature supposed to be referred to in the claims of the patent commencing with the words: 'I claim the chamber into which the fibres are thrown by the brush in combination with a perforated cone,' etc.; and
460 further, I also claim the employment of the hinged hood to regulate the distribution of the fibres upon the perforated cone, or other form, as described. And this deponent offers the following reasons for the foregoing belief, to wit: All these machines have the means of generating a current of air to waft the fur or other fibrous material to the neighborhood of the wire vellum or perforated cone, as the case may be, so they all have the exhaust or partial vacuum, by which means the current of air wafting the fur is further induced;" and if so, did you so be-
461 lieve at the time you swore?

(The witness is handed the certified copy of the affidavit above referred to.

Question objected to, unless the original affidavit of which the paper now present purports to be a copy, be produced.)

A. I have no recollection whether I so testified or not; it is quite likely I did; if I did, I have no doubt it was in accordance with my belief.

462 X 80. Has not the Fosket machine the proper cone for forming the body, and the proper partial vacuum?

A. I suppose so.

X 81. What mechanical devices do you find in the large Cowperthwaite machine here present? I use the term mechanical devices in the sense in which you have defined the term devices in your previous answer.

A. A feed-table, feed-rollers, disintegrating and blowing cylin-

der, a second picking and blowing cylinder, mainly for blowing,
having a short guide-cap, a perforated rotating exhaust
463 cone so placed in relation to the picking and blowing cylinders as that a tangent common to the two cylinders, when produced, shall pass nearly through the axis of said cone, and which axis is parallel to the greatest breadth of the sheet of fur when propelled and formed by the joint action of the two cylinders.

X 82. How many mechanical devices have you specified in your last answer?

A. I suppose seven or eight; probably seven.

X 83. Which is the first?

464 A. Feed-apron.

X 84. Which is the second?

A. Feed-rollers.

X 85. Which is the third?

A. A picking cylinder.

X 86. Which is the fourth?

A. The same cylinder, which is also a blowing cylinder.

X 87. Which is the fifth?

A. A secondary blowing cylinder.

X 88. Which is the sixth?

465 A. A cone.

X 89. Which is the seventh?

A. Presenting the cone with its axis parallel to the sheet of fur, and nearly in the plane of its impelled travel.

X 90. Which is the eighth?

A. In conjunction with the foregoing, the device, if it may be called a device, of so feeding the fur upon the table as to regulate properly the current of impelled fur in the direction of the length of the cone.

X 91. Will you please point out the eighth mechanical
466 device specified by you in the machine, and mark your initials on it in the small model?

A. Of course I can't do that, for it is not a part of the machine, but a part of the practice, as I understand it, in the operation of the machine.

X 92. When I asked you how many mechanical devices you specified in your 81st answer, and then asked you to specify which was the eighth device so specified in that answer, why did you specify a device as the eighth which you never mentioned in your 81st answer at all?

467 A. In my 81st answer I don't now remember whether I took thought of the matter of feeding as practised in this machine or not. I am certainly now quite in doubt whether this matter spoken of as the eighth device is, strictly speaking, a mechanical device. It certainly has no physical existence upon which

one can put his initials, but it constitutes a part of the practice in the mode of operation of the Cowperthwaite machine.

X 93. Can you give no other reason for omitting it in the one case and giving it in the other?

468 A. No.

X 94. Is the mode of feeding fur by hand to a machine a mechanical device, taking your own definition of device as your rule for determining it, or is it not a mechanical device?

A. I don't know. It is certainly a device; whether it is a mechanical device strictly speaking, I have a doubt. So, also, I have my doubts whether the position of a part of an organized

469 machine is, strictly speaking, a mechanical device.

X 95. Is that which you have specified as the seventh mechanical device strictly speaking a mechanical device?

A. That is a device of position such as I have referred to in my answer to the 94th question, and such another device I think I spoke of as a part of the Wells invention.

The last half of answer objected to as volunteering.

X 96. Will you please state to me why you volunteered the last half of the last answer?

A. Because I thought of it, and remembered that in giv-

470 ing the devices in the Wells machine, I had the same uncertainty as to the correct use of language in speaking thereof as I now have.

X 97. Is not the device which you have specified as the third, and the device which you have specified as the fourth, the same device?

A. It is a physical unity, having two functions.

X 98. How many distinct devices do you find in the large Cowperthwaite machine, counting a physical unity as a unity when it occurs, and omitting everything which you say are not,

471 strictly speaking, mechanical devices, treating the term mechanical device as you yourself have defined?

A. A feed-table, two feed-rollers, one picking and blowing cylinder, one blowing cylinder with a cap adjustable about the first mentioned picking cylinder, a perforated cone, an apparatus for rotating it, one fan for exhausting it.

X 99. How many does that make?

A. I have enumerated eight, all of which I understand to be simple mechanical devices, having a physical existence.

472 There are many other parts connected with these and going to the construction of the machine, but they are minor devices which I don't consider important to enumerate.

X 100. What mechanical devices, using the term in the sense in which you have defined it, have you specified in your last answer, which you did not specify when I asked you, in 81st question,

what mechanical devices you find in the large Cowperthwaite machine here present?

A. I have specified nothing not contained in my analysis
473 in that answer; but the analysis here varies from the analysis there, as well as I remember, as follows: I here specify two feed-rollers, and there specify those two feed-rollers as a feeding apparatus, or feed-rollers enumerated as a unity. One picking and blowing cylinder here, I enumerated as two devices in that case, to wit, a device for picking and a device for blowing; the perforated cone I enumerated as a device here, so also the apparatus for rotating that cone, so also the fan for exhausting that cone, making three parts here, all of which are enumerated as
474 one device in that analysis, to wit, a perforated rotating exhausted cone.

X 101. Which of the devices mentioned in your 98th answer was known before the date of the Wells machine?

A. All, I believe, taken each by itself, with the exception of the blowing cylinder mentioned in connection with the cap, and adjustable about another blowing cylinder. I don't remember that in any organization with that characteristic or the characteristics which I have mentioned in connection with it.

475 X. 102. Is not a blowing cylinder with a cap an old device?

A. Yes.

X 103. What is the specific function of the device which you have specified as a "blowing cylinder with a cap" in your 98th answer?

A. To deflect the current generated by the first picking and blowing cylinder, and condense it with the fur in it into a sheet by means of generating another current, and casting it against the current produced by the first picking and blowing cylinder
476 mentioned, and with it (that is, the second generated current) such fur fibres as may have got into it (the second current) by the two being in the immediate neighborhood of each other, and mixing their currents more or less with each other, and perhaps some disintegrated fur which may have been taken by one set of picking teeth from the other set of picking teeth.

X 104. What is the function of the blowing cylinder and cap as used in any of the machines prior to the date of Wells'
477 patent?

A. To generate a current of air.

X 105. For what purpose?

A. For the purpose of the current to carry forward the disintegrated fur.

X 106. In what direction was the disintegrated fur so carried forward in such machines?

A. Towards the point where they were to be deposited upon the vellum or perforated surface, as the case may be.

X 107. How do the case and blowing cylinder produce
478 this effect in said machines?

A. The blowing cylinder by its rotation throws off in a tangent the air centrifugally, and the casing upon and about the portion of periphery of the rotating cylinder, preventing the escape of the air in that quarter; it only escapes in those portions where not enclosed, and the direction of this current is thus to some extent modified, varying as the degrees of the circumference enclosed or left open vary.

X 108. What direction would the current of fur take in the Williams machine shown in drawing figure 6, annexed to
479 his application for patent, and the corresponding description in the 10th vol. of Newton's Journal? I mean what would be the direction it would take under the influence of the blowing cylinder and casing or cap without reference to the exhaust of the cone?

A. In the drawing figure 6 I can't tell with any certainty what the course would be. There is no casing shown in the drawing, but I suppose it had one; how far it extended I can't say. It is clear that the blower rotated the top of it towards the disintegrating engine and the bottom outward in the direction of
480 the exhausted cone; there are marks on the drawing to indicate the direction of the fur as probably supposed by the draughtsman, but I think in the action of a machine constructed like this the having a fan as described in this organization would cause the current to diverge much more than is shown by the marks supposed to have been intended to indicate the current of fur fibres. The corresponding description referred to in the question I suppose to be figure 6, which is a drawing very similar to the other
481 figure 6, and having the same indefiniteness as to the extent of the casing. In the description of the letter-press, referring to the drawing, the patentee says: "Another mode of operating is shown at figure 6; it also represents a carding engine which seems to refer back to the other mark represented in figure 5, and going back to the description in the same patent of the description of figure 5 I find this language: "The patentee therefore makes use of a fan at D, covered on the top, and revolved with considerable velocity by a strap; this fan blows the material
482 finely opened from the doffer into the air, from which suspended state it is drawn down, laid and deposited upon an endless revolving apron," etc. Turning to figure 5, it appears that there is a casing at D, extending over about half of the cylinder, but the drawing also attempts to show or represent the current of fibrous material; but if that is correct, I cannot be correct as to the amount of the circumference of the cylinder which is en-

closed by the casing, because the fur is represented as issuing above that portion of the cylinder where the casing ends, and from a portion of the cylinder which is enclosed by what I
483 have supposed to be represented as constituting the casing; going back again to figure 6 and looking to that portion of the drawing which is supposed to be intended to represent the current of fur, I find there that the current of fur, as there described, pitches over the inner cone mainly upon the outer cone, while in what the question calls the corresponding drawing in the application for the American patent, the current of fur is represented as pitching down in an oblique curve upon the inner cone. With all this indefiniteness it is impossible to say what specific direc-
484 tion the fur would take in a machine constructed in accordance with the drawings inquired about.

X 109. Confining your attention to the Williams machine for forming hat bodies as represented in figure 6 of the drawing of the English patent and American application, do you find the fan represented as cased, or not?

A. I should say not.

X 110. Is this the principal reason why you cannot say in what direction the fur would be thrown by the fan?

485 A. Yes; because without a casing it would take a very wide range, and with a casing that range might be narrow; but the amount of the narrowing, and the consequent direction, would depend upon the extent of the casing, as I have before stated in answer to a former question; and as there is no casing shown that I discover in the drawings referred to, the extent of the casing which I suppose the fan to have had cannot be gathered or concluded by the drawings themselves, as well as I see.

X 111. Will you please explain to me how it happens
486 that when Mr. Keller, in the 9th question in chief, asked you, "in the Williams machine for forming hat bodies as represented in figure 6 of the drawing, both in the English patent and American application, in what direction the sheet of fur fibres would be thrown by the fan," etc., you stated your opinion as to the direction, and assigned as a reason in the 10th answer, that a fan cased as represented in the drawing, and revolving in the direction represented, would be likely to expand the sheet in its thickness, etc.; and when I ask you a similar question, you
487 cannot tell me the direction, and cannot find that the fan is represented as cased at all? Please refer to your 9th answer, and explain to me how you discovered a case then that you cannot discover now.

(Question withdrawn.)

X 112. When you used the expression in your 9th answer, "because that a fan cased as represented in the drawing, and revolving in the direction represented, would be likely to expand the sheet in

its thickness so as to be equal or nearly equal to the breadth
488 of the machine," was it any easier to discover the casing represented in the drawing than it is now?

A. When I answered the 9th question, I was speaking of the machine represented in the drawings, figure 6, of the two patents of Williams, in contradistinction to the other machines which had been the subject of inquiry immediately previous to the 8th question; and in using the language in answer to the 9th question quoted above, I seem to have made an error in saying a fan cased as represented in the drawing, instead of a machine such as
489 referred to in figure 6 of the drawings. I had previously gathered my opinion of what that machine was from the old patent or patents, application and drawings, as is my custom when I undertake to speak of the character of a patented machine. My understanding of that machine then was, and now is, that it had a casing over the fan; but taking the whole language of the patents and the drawings, it is clear that the spread of the current must have been considerable. I don't know that I have undertaken to say with any degree of accuracy how much. I
490 think I did say that it might have equalled the breadth of the machine; it will be recollected that in my answer to the question 108, which question was about the same machine, I included in my answer the general description in the letter-press of the English patent referring to this part of the Williams machine represented in the drawings, figure 6, coming to the conclusion that I could not tell with any considerable degree of accuracy to how great a breadth the current would diverge, and that afterwards the question was put, No. 109, by the terms of which
491 I was confined expressly to the drawings, figure 6, in the two patents. In answer to the last clause of your question, I have only to say it was no easier to discover the casings in the drawings, figure 6, then than now, that I know of. I don't think I discovered them then, or pretended to; and I am sure that I do not now.

(All that part of the answer which precedes, in answer to the last clause of the question, objected to as being a volunteer of the witness, there being but one clause to the question, the
492 former part of the witness's answer being directed to some imaginary first clause which does not appear on the record, and is, therefore, irresponsive.)

X 113. Can you now tell me what direction the fur takes as it leaves the blower and case in the Williams machine, to which we have been referring?

A. In a direction towards the cone, in a curve oblique to the perpendicular of the axis of the cone.

X 114. Is not the oblique direction the resultant of the
493 direction in which it is thrown from or leaves the fan and

case, and the currents entering the perforations of the exhausted cone, modified slightly by the gravity of the fur?

A. Yes, all but the slightly; I should think that should be considerably.

X 115. How wide would be the sheet of fur fibres in the Williams machine above referred to, at the instant it left the fan and case?

494 A. I can't answer that with any considerable accuracy; it would be about as wide as the length of the fan. I can't tell how long that was; the machine which brings the fur forward to the blower is said to be, and appears to be, a carding engine, probably for wool; the usual length of the sheets upon a wool-carding engine varies from two to four feet; two feet was the widest that I remember of seeing in my early experience; they have been generally used gradually wider up to four feet, and I think, on further reflection, six feet have been used, in some cases, for wool.

495 X 116. How is the width of the sheet of fur fibres at the instant it leaves the fan and casing controlled?

A. Mostly by the extent of the casing.

X 117. Please state what direction the sheet of fur takes after it leaves the picking and blowing cylinders in the Cowperthwaite machine. Is it not in a direction inclined to a vertical line passing through the axis of the vacuum cone?

A. Yes, it is inclined to a vertical line passing through the axis of the vacuum cone, which line would cut the axis somewhat near at right angles to said axis.

496 X 118. Is not that direction determined in whole or in part by the direction imparted to the fur fibres at the moment it leaves the picking and blowing cylinder, and the current of air entering in through the perforations of the vacuum cone, and the gravity of the fibres?

A. In whole, no. In part, yes.

X 119. What other element affects the direction due to the three causes mentioned in the last question?

A. The last question speaks of the fur fibres at the moment it leaves the picking and blowing cylinders, by which I under-
497 stand the currents in their direction at the time of their departure from the action of the picking and blowing cylinders, at which time the currents are thicker than they afterwards are, and have a different angle of movement in relation to the picking and blowing cylinders than they afterwards have when they are conveyed into one common sheet, and take the direction resultant to the converging directions of the two currents; and besides, I think that any change from that line of travel after
498 the two have converged into one, which may be due to gravity, will be exceedingly slight.

X 120. Please specify how many distinct forces or impulses act upon the sheet of fur fibres after they leave the disintegrating apparatus and until the fibres are deposited on the cone in the Cowperthwaite machine?

A. I should say four.

X 121. Which is the first?

A. The picking and blowing cylinders.

X 122. What direction do they impart or tend to impart
499 to the fur fibres?

A. A direction more or less inclined to a common tangent of the two cylinders, and converging thereto.

X 123. What is the second force?

A. The deflective force which takes place in the two currents as they impinge one upon the other.

X 124. What power imparts the force mentioned as the second force in your 120th answer?

A. The driving power of the machine acting through the
500 picking and blowing cylinders, gives motion to the current of impelled fur, and there the inertia still acting to carry forward the two currents in angles converging towards each other, causes the two to impinge against each other.

X 125. What direction does the second force referred to in your 120th answer give, or tend to give, to the fur fibres?

A. In a plane nearly in the direction of the axis of the cone.

X 126. How does the direction of the second force compare with that mentioned by you as due to the first in your 122d
501 answer?

A. It is more or less inclined to the directions of the currents due to the first forces.

X 127. How much inclined?

A. I can't say how many degrees. I think that the direction of the current due to the lower cylinder and its surroundings would be mostly above the cone, while the direction due to the motion of the upper cylinder and its surroundings would be rather
502 below than above the axis of the cone as an average, but both currents, when used separately, would diverge considerably in their travel from the picking and blowing cylinders.

X 128. What is the third cause to which you alluded?

A. The current due to the exhaust of the cone.

X 129. What direction does that impart, or tend to impart?

A. Towards the axis of the cone in one direction, and towards the tip of the cone in another direction; that is, I mean to say that the current would be narrowed in the neighborhood of the
503 cone somewhat by the exhaust.

X 130. What is the fourth cause?

A. Gravity.

X 131. What direction does it impart or tend to impart?

A. Downwards.

X 132. Suppose the second cause was to cease to act, and the other three were to continue; what would be the difference in the ultimate or resultant direction due to the cessation of the second cause?

504 A. I can't suppose that, because I can't understand how the other three can act simultaneously without the action of the second; that is, the impingement of the two currents.

X 133. What would be the resultant direction due to the direction mentioned in your 122d answer, in your 129th answer, and in your 131st answer?

A. Towards a section of the circumference of the cone, having its central line nearly in a plane extending from the axis of the cone towards a line drawn half-way between the axes of the two picking and blowing cylinders, because the currents
505 must impinge of necessity and would give the direction I have mentioned.

Continued Oct. 23d, 1856.

X 134. Please mark upon Exhibit 20 (which purports to be a reduction of Exhibit 10) the four several directions mentioned in your 120th answer. Mark them by arrows, and number the arrows as you have numbered these directions in your 121st, 123d, 128th, and 130th answers, supposing Exhibits 10 and 20 to be correct representations of the positions of the several parts of
506 the Cowperthwaite machine as it was used by him.

A. I have indicated on this drawing, which is rather small for the purpose, as well as I can, what I supposed would be the direction of the currents inquired of, leaving out the downward curve which would be due to gravity; that I think would be exceeding slight, and I have not undertaken to give it any indication upon the drawing. It will be observed that in the first set of arrows under No. 1, they are slightly curved towards the centre of the common sheet, propelled by the two picking and
507 blowing cylinders, approaching towards the arrow-heads, a direction parallel to the common tangent, as the currents are supposed to move in consequence of the impingement, so that the feathers of the arrows are nearly tangential to their respective cylinders, and that tangential direction is the direction due to the impelling force of the picking and blowing cylinders. The heads of the arrows under No. 1 approach the direction due to the impinging force. The arrows No. 2 indicate the direction resultant to the impinging force, being nearly parallel to the common tangent of the two picking and blowing cylinders, but diverging
508 slightly. The third set of arrows indicate mainly the direction mentioned in the last set, but the heads of the two outer arrows curve slightly inwards in the direction of the axis of

the cone, as I have supposed would be the case with the outer portions of the common sheet of the impelled fur, in consequence of the action of the exhaust within the cone, and the rushing in of the surrounding atmosphere to the partial vacuum, thus slightly thinning the sheet of fur in the immediate neighborhood of the cone. In my former answers referred to, I had assumed the
509 cone to occupy a position with its axis nearly in the line of the common tangent, where I have drawn a circle to represent the cone, and placed H. W. therein; the primary position of the cone in the drawing is represented by the double circle below, and if that was the position of the cone, the current of fur would be lost on it farther towards the top than in the other case, and perhaps in a rather broader section, so the current of fur would be more curved downward by the action of the exhaust within
510 the cone. In regard to the downward movement of the current by gravity—that is to say, if the movement of the picking and blowing cylinders be very rapid, as I understand it to be—the downward curve would be very slight, but it would be greater as the impelling force is reduced, because gravity remaining a constant force, and the inertia being diminished, would of course increase the downward curve.

X 135. On what portion of the circumference of the cone for the time being would the fur be deposited, supposing the double
511 line to represent the position of the cone?

A. Perhaps one-half, or thereabouts. It would be greater when the bat was nearly formed than in the commencement, in consequence of the diminution of the exhaust current.

X 136. Did you state anywhere in your previous answers to answer 134 that your answers in reference to the Cowperthwaite machine were based on the assumption that the cone occupied a position with its axis in the line of the common tangent?

512 A. I have not so stated previous to the answer.

X 137. In your previous answer, in reference to the Cowperthwaite machine, what position have you assumed the upper picker roller to occupy?

A. Farther forward over towards the cone than it is at present adjusted on the machine.

X 138. Is it not now adjusted on the machine in the same position as it is represented in drawing Exhibit 10, so far as you can tell?

A. I should think it might be about the same; it appears
513 to be set as far back as the construction of the adjusting parts of the machine will admit of.

X 139. Did you state in your previous answers in reference to the Cowperthwaite machine that those answers were based upon the assumption that the upper picker was set further forward?

A. I think not.

X 140. Have you ever seen Cowperthwaite run his machines, or any one else, at his factory?

514 A. No.

X 141. Of your own knowledge do you know what position the upper picker occupied on the machines when run by him, or at his factory?

A. No.

X 142. What effect has the placing of the picker in the position as shown in the machine now present on the action of the machine as compared with its action under the assumption made by you in your previous answers?

A. It pitches the current higher up in relation to the
515 cone, throwing a portion of the sheet farther over the cone, and depositing the current of impelled fur upon a broader section of the cone; the central line of which section, when drawn parallel to the axis of the cone, being also farther over on the cone.

X 143. Over how much broader section would the fur be deposited, the upper picker occupying the position which it now does?

A. Perhaps about as much as a half of the circumference of the cone is greater than one-third of the circumference of the
516 cone.

X 144. Why will it be deposited over a greater section in this case?

A. Because a portion of the impelled fur, together with a portion of the current of air passing above the cone, will by their inertia be carried beyond the axis of the cone before being brought down and deposited upon the cone by the exhaust currents; gravity slightly, and more than in the other case, assisting, as I have indicated by the arrows A and B, upon Exhibit 20; this is as near as I can judge, but the curve will be varied as the force of the
517 currents are varied, and as their relative forces are varied.

X 145. Is the action of the machine, as just described by you, materially different from what it was on the assumptions made by you in giving your previous answers to answer 134?

A. I should say not. I don't think it would work as well, and if the currents generated by the picking and blowing cylinders are very strong, and the exhaust current very weak, there would
518 be danger of injuring the bat.

X 146. If these currents, generated by the picking and blowing cylinders, were not too strong, and the currents generated by the exhaust fan not too weak, would there be any material difference between the action of the machine with the position of the picking cylinders, as represented in the large machine now present, and the action upon the assumption of the parts being placed as you assumed in your answers previous to answer 134?

A. I think not.

519 X 147. Would you have modified yonr answers previous to answer 134 had your attention been directed to the upper picking cylinders, being kept, as they are now, in the large Cowperthwaite machine here present, while such machines were being run?

A. Not substantially, I think; it is palpable I should have mentioned the curving of the sheet of fur as indicated by the arrows a and b upon Exhibit 20, and should not have said that the motion of the sheet was in the direction of the tangent common to the picking and blowing cylinders towards the axis of the cone
520 nearly in a direct line.

X 148. Do you know of your own knowledge that there would be any practical difficulty in the working of the machine with the upper picker occupying the position it now does in the large machine here present?

A. I have no practical knowledge of the operation of that machine, but I think the machine would work rather better with the upper blowing cylinder further forward.

X 149. What reason have you for thinking so?

A. Because I think the machine could be operated with more rapidity, and form more hat bodies in the same length of
521 time, by carrying the blowing cylinder further forward.

X 150. Is the mode by which the bat is prepared for removal from the conical former, as described in the English specification of Williams, and in his American application for a patent, a process?

A. There is some doubt about this. It is a proceeding, and part of a process; in the English patent, and in the application for an American patent, I find described what may be fairly considered perhaps as a process in that part of the manufacture de-
522 scribed in that patent which I have before referred to as being somewhat analogous to papier-mache, to wit: "A sufficient quantity of the fibrous material having been deposited on one form, another made in two halves, as shown detached at figure 7, is placed over the material and inner form, and the whole removed together and dipped into the adhesive composition before described, which saturates it; the material thus combined is taken from the forms and dried;" and in addition thereto in the American
523 application, I find in a parenthesis, after the words "two halves," and before "as shown," which follow those words, ("when its form requires it,") there seem to be complete proceedings for the removal of the form as inquired of in the question. In the application for an American patent I find the following words: "If the forms for hat bodies are required for felting, they are removed to another machine, where they undergo the process of basoning or hardening whilst between the forms," which description is not a full process or proceeding for a removal of the forms

as inquired of in the question, and there being no manner
524 described of how they undergo the process of basoning or hardening whilst between the forms, except that they are done by a machine.

X 151. Is not the mode of preparing a bat for removal from the conical former, described in Williams' English specification in Newton's Journal, a process or not, or is it a partial process or not?

A. I think it is a process.

X 152. What are the steps which constitute that process, and how many are there?

525 A. Placing the outer form over the material and inner form, and dipping into the adhesive composition to be combined with it the material, and which saturates it, and the taking off, making four.

X 153. Which is the first?

A. Covering.

X 154. Which is the second?

A. Removing altogether.

X 155. Which the third?

526 A. Dipping.

X 156. Which the fourth?

A. Saturating and combining with the adhesive mixture, and I think I should have added before, and do that now, that the taking of the whole together out of the adhesive mixture, making five steps.

X 157. Does the American application of Williams contain these five steps?

A. Yes.

X 158. Is the invention of Wells, so far as relates to the
527 removal of the bat from the conical former, a process or not?

A. I think it is a process.

X 159. How many steps has that process? Specify them numerically.

A. In the specific manner described by Wells, the first step is to wrap a cloth of felt wet with hot water upon the bat and inner cone; the whole is then removed together, which is the second step; the whole is then dipped together, which is the third step, and the commencement of hardening the bat by felting; the whole is then taken out together, which is the fourth step; the
528 hardening in the bat by means of felting being further accomplished by the removal and the passing of the hot water through its texture, complete what may be denominated the fifth step.

X 160. Have you not omitted the placing of an outer covering over the cloth and bat?

A. I have. That is first part of the first step.

X 161. What are the devices incidental to the five steps in the Williams process? I use the term device in the sense in which you have defined it.

529 A. The covering of the bat on the cone while still under the pressure caused by the exhaust; the removal from the machine of the two forms with the bat between them for the purpose of dipping; the dipping for the purpose of saturating and combining the fibres of the bat with the gummy mixture; the removal from the dip to enable the bat to be removed.

X 162. Did you use the term device in the sense which
530 you defined it in answer 53?

A. No; in answering that question, I was speaking of a machine—here of a process; and in speaking of that process I have looked more to the elementary functions and to the mechanical devices used to carry out that process.

X 163. What mechanical devices are used to carry out the process in the Williams invention?

A. An outer and inner form for enclosing the bat, a vessel for containing the gummy mixture.

X 164. What are the devices in the Wells invention? I
531 use the term device in the same sense in which you understood it in answering the last question.

A. In the specific description by Wells an inner form, (and if necessary, another inner form to support the first,) two pieces of felt or cloth, an outer form, and a vessel for containing hot water.

X 165. Does the patent of Wells exhibit any other mechanical devices by the use of which the bat could be removed from the cone on which it had been formed?

A. He does not describe in his patent, in terms, any other
532 mechanical devices that I can recollect of.

X 166. Does he state in said patent that the immersion of the bat in hot water would felt it?

A. Not in terms, that I discover; but he does say, "whilst immersed in hot water to harden."

X 167. Will the mere immersion in hot water felt the bat?

A. I think so; because in the immersion in hot water the mechanical action by means of the currents in saturation will tend to interlock the fibres. I believe it is also understood that the
533 chemical effect of the hot water facilitates the felting.

X 168. Does the patentee state that the mechanical action of the currents of water tend to felt the bat?

A. I don't see that he does.

X 169. You have examined, in making your several answers, the reissued patent of Oct. 7, 1856?

A. Casually, but not very closely.

X 170. Please refer to this patent, and examine it carefully, and see whether you wish to correct your answers.

534. A. On further reference to the patent, I find that the said Henry A. Wells states therein that his invention consists in forming a bat of fur fibres on a perforated cone, or on other forms, in combination with the hardening of such bat, and so forth, by the well-known process of felting. So it appears, by fair inference, that the hardening of the bat is by felting, and therefore the immersing is for the purpose of felting.

X 171. Will you please refer to the original patent of Henry A. Wells, of April 25, 1846, and state whether you can find
535 therein that the hardening of the bat while immersed is by felting; and if so, quote the language from which that could in like manner be inferred.

A. I don't see it so stated in the patent.

X 172. Do you find any language from which it could be inferred?

A. Referring merely to the patent, I should say not.

X 173. Would not the language contained in the portion of the original patent in which the inventor stated in what he then believed his invention to have consisted, namely, in the fol-
536 lowing words: "And therefore my invention also consists in covering the bat before it is removed from the cone or former with felted or full cloth, and then employing one or two perforated metallic cones—one to put over the bat after it has been surrounded with the moist felt or cloth, for the purpose of making pressure on the fibres, and to admit of the circulation of hot water when the whole is immersed therein, to harden the bat preparatory to felting, and the other," etc.—would not, I say, this language, by a like inference to that which you made in your
537 170th answer, make it appear that the hardening of the bat while it was immersed was not by felting? I merely ask what would be the inference from the language in this case.

A. No. I understand by this that the patentee, when he
538 says "to harden the bat preparatory to felting"—I understand that word felting to refer to that particular part of the process of the manufacture of hats referred to in the reissued patent, where it says that it may be removed from such cone preparatory to the after and well-known process of sizing or felting. It is clear enough that the patentee, at the time of making this original patent, understood the necessity of the circulation or mechanical action of the hot water, because he recommends the inner cone used to support the cone upon which the bat is formed
539 when very thin and weak, for the purpose of resisting the pressure of the surrounding water, consequent upon a partial vacuum produced within when the whole is withdrawn from the water. Now, whether the patentee knew that felting took place in consequence of the circulation of the water does not appear, except it follows as an inference that inasmuch as he must

have known that the mere saturation of the bat by hot water could not harden it, and that the circulation of the water through it would harden it, and there was no more chemical affinity with the circulation of the currents than without them, therefore he
540 must have understood that the mechanical action due to the currents interlocked or felted the fibres.

X 174. What would be the inference from the language "to harden the bat preparatory to felting," to a person who had not learned what effect hot water alone would have, or hot water circulated?

A. The inference is, the bat is to be hardened before it is felted, because he says "preparatory to felting."

X 175. Would not the inference be that the hardening
541 of the bat was not by felting?

A. Taking the words quoted alone in the previous question, it would be so.

X 176. Suppose the roller in the Fosket patent was removed from contact with the bat until the fur was all deposited on the cone, and that after the fur was so deposited, and while the exhaust was still acting on the cone, the conical roller was to be brought in contact with the fur on the straight part of the cone, and then made to vibrate as well as to revolve; would not the action of such roller be substantially the same, so far as the straight part of the cone is concerned, as the invention described in the Wells patent of October 7, 1856?

542 A. No.

X 177. Why not?

A. In the first place such action could only felt a portion of the bat, while the invention described felts the whole of it; and besides, I think that it is particularly faulty in not having something intervening between the roller and the bat; with this exception, that is, an intervening substance, and speaking very broadly, it would be substantially the same as the process described by Wells, provided you leave out of that method of proceeding described by him that part of the felt covering which is to cover the tip,
543 and that part of the outer cone which comes down on the tip.

X 178. Why did you say "speaking very broadly," after having made all those exceptions and provisions?

A. What I meant to say in the last answer was, that operating the jigging-roller without an intervening substance would be substantially the same in mode of operation as that described by Wells, taking no account of the hardening of the tip of the bat,
544 and it is speaking broadly to say that.

X 179. What device is shown in the Wells patent by which the whole of the bat could be felted without the use of hot water, using the term felting as you have used it?

A. None that I recollect of.

X 180. What device was known for felting bodies which had

been formed on a perforated cone, without the use of hot water, at the time you first examined the Wells patent and understood that invention?

A. As well as I remember, I knew of no other at that
545 time. It now appears that a method of hardening bats (formed by winding) by mechanical action, using steam instead of hot water, was known before that time.

X 181. Who was the first person, to your knowledge, who availed himself of the chemical action of hot water alone on the bats of fur fibres in connection with the circulation of water through such bat as a means of hardening the delicate fibre of bats formed on a vacuum cone?

(Question objected to for the reason that it assumes that
546 the witness has testified that water has a chemical action in the process of hardening a bat.)

A. I think Wells; and I think I did say that I believed it was well understood that the chemical action of the hot water tended to facilitate the hardening by the mechanical action of the currents; but whether it is not true that the steam would do just as well as the hot water, I don't know; and whether there is in fact any chemical action upon the fur I don't know, either by the hot water or by the steam. I am no chemist.

547 X 182. Why then did you attribute the action of the hot water on the bat in the Wells process partly to the action of the currents in saturation, and to the chemical effects of the hot water?

A. Because I then believed (and I believe now) that the felting took place much more readily with hot water than with cold, and that there was no greater mechanical action of the currents in passing through the bat when the water was hot than when cold, and I chose to attribute that difference to the chemical effect of the hot water; whether it is a chemical effect in fact, I am not able
548 to say.

X 183. Do you consider or understand Wells to have been the first person to discover that the circulation of hot water through a mass of fur fibres incidental to the process of saturating such mass, would tend to interlock or harden the fibres or mass of fibres?

A. I should say not.

X 184. Had that knowledge been rendered available in practice in hardening bats before his patent?

A. Not to my knowledge, as well as I now recollect.

549 X 185. Do you consider that the action of hot water so circulating through a bat would be materially different from the circulation of steam?

A. I should think not.

X 186. Had the circulation of steam through a bat for the purpose of hardening it while on a perforated cone been known before the date of Wells's patent?

A. I understand that it had; but the cone was perforated
550 merely for the admission of the steam through it, the bat having been formed by winding, and the steam was not relied upon for the mechanical action necessary to the felting; that was accomplished by additional mechanical means.

X 187. What advantage was there in the substitution of hot water for the purpose of hardening bats formed on a perforated cone by a vacuum, over the mode of hardening them by the use of steam and a mechanical motion such as described in your last answer?

A. It enabled good bats to be formed ready for the final
551 felting of fur fibres, instead of bats formed from a web or sliver which had previously been formed into such web or sliver of fur fibres, thus avoiding the double operation of forming the sliver and winding the bats, and besides, avoiding the laminated structure of the bat due to the double process of forming into a sliver and then winding into a bat.

X 188. Why could not the bat so formed of fur fibres have been as well hardened by the use of the steam and mechanical motion before known as by the use of the hot water?

552 A. It could have been hardened by the steam instead of the hot water, with a suitable knowledge of a mode of proceeding, whereby the steam could be brought to act upon the bat while under the pressure caused by the exhaust, or by placing something over the bat after the manner of Wells, while still under the exhaust, to enable it (the bat with its surroundings) to be removed from the exhaust for the admission of steam properly to accomplish the mechanical action necessary to the first felting.

X 189. Who was the first person who gave the informa-
553 tion of a mode of procedure whereby the steam could be brought to act upon the bat while under the pressure caused by the exhaust?

A. I don't know that.

X 190. Did Wells, to your knowledge?

A. I don't know that he did.

X 191. Who was the first person who gave the information that something could be placed over the bat while still under the exhaust to enable the bat, with its surroundings, to be removed from the exhaust for the admission of steam properly to accomplish
554 the mechanical action necessary to the first felting?

A. I don't know that.

X 192. Did Wells?

A. I think not.

X 193. Could not a bat formed of fur fibres, formed on an exhaust cone, be as easily hardened, either by steam or mechanical

means, or by the application of hot water, as a bat formed by winding?

A. No.

555 X 194. Why not?

A. Because the bat when so formed of fur fibres has not the same tenacity as when wound; but still, when once brought under control for hardening with suitable appliances, it could perhaps sooner undergo the amount of felting necessary to harden it sufficient for its removal from the cone, than a like amount of felting could be accomplished in a wound bat.

X 195. What do you mean by suitable appliance?

A. Such as will hold the bat in place while the steam is

556 admitted through it, with a proper manner of bringing the steam to bear upon it, so that a suitable amount of mechanical action may take place upon the fibres of the bat to interlock them without endangering the primary structure thereof.

X 196. Was it not known that a bat of fur fibres, when felted together on a cone, could be removed from it before the date of Wells's patent?

A. I think so.

X 197. Was it not known that if a bat of fur fibres was

557 so felted after they had been deposited on a cone, that the felted mass would possess sufficient strength to permit of its being removed?

A. I have no doubt it was.

X 198. With the knowledge of this fact, what merit do you attribute to Wells as an inventor, so far as removing the bat from the cone is concerned?

A. In the mere removing it after it is hardened, I don't discover any invention.

558 X 199. What was the invention of Wells so far as relates to the removal of the bat from the cone on which it had been formed?

A. Devising a means by which the bat could be properly hardened by felting, preparatory to its removal from the cone on which it was formed, without essentially disarranging its primary structure.

X 200. Did not the means which he devised depend mainly for its efficiency on the circulation of currents of hot water in saturation, together with what you have termed the chemical

559 effect of hot water?

A. The specific contrivance or process described by him in his patent, depends largely for its efficiency upon what the question mentions.

X 201. Did Wells, to your knowledge, ever devise any other means by which the bat could be properly hardened by felting

preparatory to its removal from the cone on which it was formed, without essentially disarranging its primary structure?

A. No.

560 X 202. Who was the first, to your knowledge, who did devise any other means by which the bat could be properly hardened by felting, preparatory to its removal from the cone on which it had been formed, without employing as an essential or main feature the chemical action of hot water or steam, using the term chemical as you have before used it?

A. I can't speak with any chronological certainty to that question. My impression is, that I first saw described the mode
561 of hardening in the dry way in a patent granted to Taylor, Alva B. Taylor, I think.

X 203. For what purpose is the felt cloth employed in the Wells process?

A. To hold the fur upon the cone while removing it from the exhaust, by making pressure upon it.

X 204. Does it perform any other function than the outer cone; and if so, what function?

A. The outer cone is an adjunct to the felt, "the more effectually to hold the fibres of the bat, and to make a slight pres-
562 sure on it," and to make the whole together sufficiently strong to bear the pressure incident to the dipping.

X 205. Could not the felt be omitted without affecting the process?

A. I think the process would be substantially the same without the felt.

X 206. Can you name any specific function which it performs which is not fully performed by the outer cone without it?

A. I don't think of any essential function.

563 X 207. How is it, that the disarrangement of the primary structure of the bat is prevented in the Wells process?

A. By substituting for the pressure of the atmosphere something to take the place of it to maintain the fur upon the cone before its removal from the exhaust, and by having a suitable covering on the bat to allow of its being dipped in hot water in such manner as that currents of water shall pass through it without disturbing the primary structure of the bat.

564 X 208. Who was the first person, to your knowledge, who devised a means by which the bat could be properly hardened by felting, preparatory to its removal from the cone on which it was formed, without essentially disarranging its primary structure, which means preserved the pressure of the atmosphere on the fur during the process of felting?

A. I think that was Barnum, but I am not certain.

X 209. Did Wells, to your knowledge, ever devise such a means?

565 A. No.

X 210. Who was the first person, to your knowledge, who invented a means of hardening by felting while on the exhaust cone without the use of steam or hot water?

A. I don't know that; I think it was the Taylor before referred to, because I think I first saw it in a patent granted to him.

X 211. Who was the first person, to your knowledge, who devised a purely mechanical means or mechanical device for

566 hardening the bat while on the cone on which it had been formed, by felting preparatory to its removal therefrom?

A. I can't answer that; that depends upon the question whether the processes of Wells and Barnum include a chemical means. If they did, to the best of my knowledge it was Taylor.

Re-direct, by Mr. Keller.

Q. 212. What knowledge have you of the art of making

567 hat bodies by the hand process?

A. My general knowledge of the art is considerable, having had occasion to study it some in connection with this subject, and I have been familiar with it by observation, as it was practised before the introduction of the Wells machine.

Q. 213. On your cross-examination you have stated that you have never seen a machine in operation constructed in accordance with the description in the Wells patent, and that in the machine which you did see in operation the deposit of the fur was

568 regulated or controlled by the form and position of the delivery aperture of the trunk. State how the same machines corresponded with or differed from model Exhibit B.

A. I have seen them like this model.

Q. 214. On your cross-examination you have testified that in the Wells machine the hood serves to modify the delivery orifice of the trunk or the current issuing therefrom, so as to distribute the fur in properly regulated quantities on a section of the

569 cone. In your opinion, is or not the use of the said hood essential to the operation of the machine in throwing or depositing a sheet of fur upon the whole length of the cone, on a section of its circumference?

A. It is.

Q. 215. On what part of the cone would the sheet of fur be deposited if the hood were removed?

A. On a section of the circumference and the whole length of the cone. If the trunk were as it now is in this model Ex-

570 hibit E, and the cone as it now is, and the blowing current pretty strong, I think some of the fur would be wasted over

the top of the cone; but I think it might be worked so as to deposit all the fur without the hood.

Q. 216. How would it be, assuming the delivery orifice of the trunk to be proportioned to the cone as described in the reissue of the Wells patent?

A. If the delivery orifice of the trunk was properly formed in proportion to the cone, and of proper proportional size to the
571 cone, and the delivery aperture properly presented in position to the cone, as is described in the reissue of the Wells patent, the hood can be dispensed with.

Q. 217. On your cross-examination you have testified that in the specific construction described by Wells you do not see that any of the devices enumerated by you could be well dispensed with; state what would be the effect in a specific construction of any machine, of dispensing with any one of the devices entering into its composition.

A. Well, if I understand the question, the effect would be
572 to destroy the identity of the organization unless some equivalent means of performing the office of that device was substituted.

Q. 218. If a mechanical device were added to the Cowperthwaite machine, performing the function automatically of feeding the fur upon the feed-table in the varying thickness which is effected by the skill of the operatives, what effect would it have upon the substantial identity of the said machine?

(Objected to as new matter.)

A. It would not change it.

573 Q. 219. What would be the effect on the Cowperthwaite machine of hinging a hood on that end of the disintegrating apparatus opposite the tip of the cone; the said hood to be operated by the skill and judgment of the operative?

A. To enable the operative to build a bat upon it with a uniform feed on the feed-table.

Q. 220. Assuming that there be a casing in the Williams machine, represented in figure 6 of the drawings of the English
574 patent, and the American application, of such construction as to enable the fan to deliver the fur or other fibres in a thin sheet, in what direction relatively to the axis of the cone would be the greatest dimensions of the sheet of fibre in its approach to the cone, at right angles to, or parallel with, the said axis?

A. At right angles to the axis.

Q. 221. Has anything been brought to your mind in the course of your cross-examination to induce any change or modification of your opinions and views testified to by you in your examin-
575 ation in chief? If yea, state what such modifications and changes are.

A. Nothing to induce any essential change.

Re-cross-examination by Mr. Harding.

XX 222. If the trunk and hood were removed from the Wells machine, and the skill of operatives in so holding the cone that it should assume a proper direction relatively to the fibres issuing from the pickers, was substituted for such trunk and hood, would it destroy the substantial identity of the machine, provided
576 the vacuum was maintained in the cone?

(Objected to, not being responsive to any new matter brought out by the re-examination in chief.)

A. The hypothesis of the question is such as will not constitute an operative machine, and therefore the substantial identity of the Wells machine would be destroyed.

XX 223. How do you know?

A. Because after removal of the trunk the disintegrating and blowing apparatus, with such casing as would then be left
577 upon it, would blow the current of air and fur too wide in thickness for the purpose of forming a bat on the cone.

XX 224. Please describe the automatic apparatus, by which the skill of the operatives could be dispensed with in the Cowperthwaite machine in feeding the fur.

A. Such an automatic apparatus as would feed the fur upon the apron in a proper manner for forming a good bat.

XX 225. Is that all the description you can give?

578 A. No. I can invent such an apparatus, and then describe it, but I don't feel bound to do it on this occasion.

XX 226. If such a machine were invented and combined with the Cowperthwaite machine, would this compound machine be substantially the same as the present Cowperthwaite machine, provided the compound machine dispensed with the skill of the operatives, and the Cowperthwaite machine depended for its efficiency on the skill of the operatives?

A. I think so.

Re-direct by Mr. Keller.

579 Q. 229. In answer to question 224 on your re-cross-examination, you have alluded to an automatic apparatus combined with the Cowperthwaite machine, for the purpose of feeding the fur thereto, as a substitute for the skill of the operative in feeding by hand; and in answer to question 225 you have stated that you could invent such an apparatus; will you state, in view of this, what you understood question 226 to inquire of you?

(Objected to, as the question is perfectly clear, and was carefully read to the witness before he answered it.

580 Plaintiffs' counsel states that question 226 was answered at a late hour of the night, at the end of a long and protracted cross-examination, when all parties present were anxious

to adjourn, and in considerable confusion, and he deems it due to the rights of his client, as well as to the witness, to call his attention specially to the question.

Counsel for the defendant denies that either himself, the commissioner, or the witness, were in any confusion.)

581 A. I only wish to say that the state of things in the compound machine, as I understand the question 226, when considered in connection with the mode of operation of forming hat bodies upon a perforated cone, is this: that with such a contrivance upon the Cowperthwaite machine as would feed the fur properly when properly adjusted for forming bats upon a given set of cones of uniform shape and size, where the skill of the operative would be dispensed with as long as that particular size and proportion of bat was manufactured, the same as in the Wells machine as

582 now used, when once the delivering orifice is formed of proper shape and dimensions, and properly presented, any given size and proportion of bat may be manufactured without the skill of the operative; the fur would in both cases, to wit, the compound Cowperthwaite and Wells, be distributed in properly regulated quantities upon a section of a circumference of the cone; but in both cases, if the size of the form or cone, or of the relative thickness of the bat in direction of its length, were to be changed, the change would become necessary, requiring skill to make it.

583 In the Wells machine it would be necessary to change the delivering orifice. In the compound Cowperthwaite it would be necessary to so adjust the automatic apparatus as to change the feed upon the apron, in order that the fur should be distributed in properly regulated quantities.

Direct Examination of Henry B. Renwick, by Charles M. Keller, Plaintiffs' counsel, Oct. 24th, 1857.

Q. 1. Have you examined the English patent granted to T. R. Williams, and published in the London Journal of Arts and

584 Sciences, vol. x., conjoined series, page 73, and the specifications and drawings of an application for letters-patent of the United States, of the said T. R. Williams, on which letters-patent were granted the 24th day of April, 1840, including the cancelled portions of said specifications and drawings? and if yea, state whether you understand the same.

A. I have examined them, and believe that I understand them.

Q. 2. State whether the machines therein described or

585 represented are substantially alike or substantially different from the machine described in the reissue of the Wells patent of Sept. 30, 1856, or the machine of the defendants here present, and give your reasons fully for the opinion or opinions which you shall express.

A. I believe that all the machines described in the patent in Newton's Journal, and in the certified copy of the American application, are substantially different from the machine described in the Wells reissue, and also from the defendants' machine.

586 My first reason for this opinion is, that I am fully aware, both from theorizing and witnessing practical operations, that the machines, both of Wells and the defendants, will make good merchantable hat bodies of such relative proportion and thickness as may be desired from tip to brim, and am able to state with confidence, based upon a theory arrived at from observation and experiment on various machines, that there is no machine described, either in the publication or application aforesaid, that will make a merchantable hat body which may be afterwards, by the ordinary operation of sizing, made into a hat. Such a

587 different result induces the belief that there must be great differences in the construction and mode of operation of the machines. In looking at the publication and application as aforesaid, I find in the first place presenting itself most forcibly to my mind, that Mr. Williams describes the fabrics resulting from the operation of his machines, as in contradistinction to those fabrics produced by weaving, or by the deposition of pulp, or by the ordinary processes of felting, and although I find in the can-

588 celled part of his application a sort of haphazard paragraph in relation to felting, I am disposed, from the whole tenor of his description, to believe that the scope of his invention was substantially such as is set forth by himself, and that it was not his intention to apply his machinery, as an ordinary or general thing, to the manufacture of felted fabrics, which are, in the ordinary course of operation, the final result both of the plaintiffs' and the defendants' machines. In both the plaintiffs' and in the defendants' machines, a sheet of fur is impelled by a rotating picker

589 or brush, so that it approaches a cone-shaped former, suitable to the definition of a hat bat, in lines parallel or nearly parallel to the axis of the former; the machines thus having a capacity which may be taken advantage of to distribute the fur unequally in lines passing from the base to the top of the cone, while at the same time the bat covers the whole cone or former, and is held and retained thereto by the pressure of the atmosphere. On the contrary, in the only machine described by Mr. Williams, for the formation of bats suitable to be made into hats, the

590 sheet of impelled fur, however the casing of the fan may be varied, must approach the former in a plane perpendicular to the axis of the former, thus affording no such capacity or facility for distribution as is found both in the plaintiffs' and defendants' machines. Mr. Williams does speak of a cap covering the blower, (which he supposes will impel a disintegrated current of fur,) but gives no direction as to the size of that cap or its pre-

cise relative position with respect to the blower, nor does he give any drawing which will make these points clear; and while
591 in the publication he represents the impelled sheet of fur as pitched clean over the nearest former, and on to and beyond the furthest former, he in his application represents the sheet of fur as thrown on top of the nearest former; I am, therefore, only able to say that this sheet of fur, whatever be its precise direction, can approach the former only in lines perpendicular to its axis. I further find that in the machine described by him having formers suitable for hat bodies, that there is an impelling fan acting upon fibres delivered from the doffer of a carding-engine; and I
592 do not believe that a fan thus combined would impel a disintegrated current of fur, but on the contrary would throw the fur in flakes or lumps, which state of division of the fur would be incompatible with the manufacture of hats by deposition on an exhausted former, even if his machine were in other respects suitable for that purpose; I therefore find in none of his machines a combination of a rotating disintegrating picker or brush with an exhausted former of suitable shape for the deposition of hat bodies, such combination being found both in the plaintiffs' and in
593 the defendants' machines. It is to be observed, however, that Mr. Williams shows machines in which a rotating disintegrating picker is combined with forms suitable for the manufacture of long sheets or webs of fibrous material, but he gives no hint as to the combination of such a picker with forms suitable for the manufacture of hat bats, and does not seem to have known that such a picker was a vital element of the machine for the manufacture of hat bats by deposition. Mr. Williams, in his American application, does speak of the substitution of other
594 forms as being placed in the situation of the cylinder on which the web is formed, but gives no direction for the location of such other form than in the paragraph which immediately follows, and contains the description of the machine on which he says hat bodies or foundations may be formed. To my mind, therefore, it clearly appears that this latter paragraph contains his specific description of the substituted forms and their location with reference to the blowing-fan, which, as I have before stated, makes up a machine on which hat bats could not be formed by the mode of operation which I believe to be com-
595 mon both to the plaintiffs' and the defendants' machines. If a form suitable for the formation of hat bats were substituted directly for the cylinder, and the casing were removed, the exhausting current would pass into one side of the cone, through its cavity, and then out through the other side, thus stripping off the fur on the lower side and disorganizing the bat as fast as it was organized; I therefore conclude that he did not mean the mere substitution of a conical former for the cylinder, but on the con-

trary, meant, in case of substitution, to locate and combine
596 with a fan a former suitable for hat bodies in the manner exhibited in the machine represented in figure 6.

Q. 3. Will you quote the beginning and the ending of the paragraph of Williams's application, which you say, in your last answer, contains the specific description of substituted forms and their location?

A. "Fig. 6 is a side elevation of a carding engine with this invention applied;" that is the first line. The ending is: "And when a sufficient quantity of the fibrous material has been deposited
597 upon one shape and form."

Q. 4. Look at model Exhibit 7, and state what it represents.

A. It represents a machine for forming a continuous web of some fibrous material, by deposition upon a rotating perforated cylinder, exhausted by currents passing into the upper part of the cylinder, thence through its cavity and out at the lower side to an exhausting-fan, and, with the exception of a tank applied to the pressure-rollers, it is substantially like the machine represented in
598 the drawing of Williams's application before referred to at figures 1 and 4.

Q. 5. What would be the effect of forming bats for hat bodies on a perforated cone on such a machine as Exhibit 7, with such perforated cone substituted for the cylinder I, and with the surrounding casing adapted to the cone as it is adapted to the cylinder in Exhibit 7, as such casing is described in the specification and the application?

A. With a cone substituted for cylinder I, and provided with a suitable packing, and with or without a casing over the top
599 of the cone, an irregularly shaped web of fibrous material would be formed short on one selvage, if it may be so termed, and long upon the other.

Q. 6. On such a machine, would a bat be made and retained upon the entire circumference of the cone?

A. It could not. If packing on the side furthest from the picker were employed, it then would pass off in a sheet or web: and if no packing were employed, it would be drawn off the lower surface of the cylinder by the exhaust as fast as it was formed upon the upper surface.

600 Q. 7. Do you find in the said Williams's English patent, and American application, or either of them, the combination of any disintegrating apparatus, with a perforated exhausted cone, having the mode of operation of either the Wells or the defendants' machine, assuming Williams's disintegrating apparatus to be suitable for disintegrating and discharging a sheet of fur-fibres?

A. I do not.

Q. 8. What, if any mode of varying or modifying the direction of

the current of fibres relatively to the cone, do you find in
601 the Williams machine?

A. I find no method specifically described; he speaks of a cap or cover to the impelling-fan, and such cap might be so constructed as to throw the fibres on to the nearest former to the fan, or over the furthest one, but in no other direction than with the plane of the sheet of fur perpendicular to the axis of the cone. If by your question you mean modifying the direction of the impelled current by the current entering the formers, I believe that
602 such modifying would exist in machines constructed in accordance with his drawings.

Q. 9. What would be the condition of the resultant bat formed on the exhausted cone in the position represented in the Williams machine, if the fibres were disseminated promiscuously in the air above the cone, and drawn down by the currents, induced by the exhaustion of the air from the inside of the cone?

A. My opinion is, that the bat would be thickest on the crown of the hat, and thinnest at the brim; that no two bats would
603 correspond very closely in relative thickness; and that the bat would be full of flakes and lumps.

Q. 10. In your answer to the 2d question, you have used the term sizing; what does that term signify in the art of making hats?

A. It signifies the ultimate felting of the bat to render it sufficiently hard, during which process it also has its shape so altered that it may constitute a hat body. This is the sense in which I use it.

Q. 11. What portion of the surface of a cone is meant by
604 a section of the circumference of a cone?

A. A portion of its outer surface extending in one direction from the base to the apex of the cone, and of greater or less extent in the direction of circles surrounding a cone.

Q. 12. Does it mean more or less than the entire circumference?

A. Less.

Q. 13. Have you examined, and if yea, do you understand the machine described in a patent granted to Thomas Blanchard for improvement in making a batting or web for hat bodies,
605 dated June 14th, 1837?

A. I have examined a certified copy of it, and believe I understand it.

Q. 14. Will you state whether the said Blanchard machine is substantially like or substantially different from the invention described in the reissue of the Wells patent of Sep. 13, 1856, and the defendants' machine, and state wherein you find them to be alike or different?

A. I think the machine described in Blanchard's patent
606 is substantially different from Wells' invention or defend-

ants' machine, as it is a machine whose object is to make continuous webs or sheets of fur batting, which may afterwards be put into a conical shape, instead of making fur bats of that shape directly by the action of the machine. The Blanchard machine has no former of a conical shape, or analogous thereto, but, on the contrary, an endless web or belt of some perforated or pervious material.

Q. 15. Have you examined, and if yea, do you understand the machine described in the certified copy of a patent granted
607 to Henry A. Wells, James James, and Robert W. Peck, for improvement in the mode of making a batting or web for hat bodies, dated September 22d, 1837?

A. I have examined the copy, and believe I understand the machine described therein.

Q. 16. State how it resembles or differs from the invention described in the Wells reissue, and the defendants' machine.

A. In my opinion it differs substantially, for the same reasons set forth in answer to question 14; the Wells, James and
608 Peck machine being the Blanchard machine improved in details, but still operating solely to produce a continuous web or sheet.

Q. 17. Have you examined, and if yea, do you understand the description of a patent granted to H. A. Wells, and published in the London Journal of Arts and Sciences, vol. 13, conjoined series, mentioned in page 191, and extending to page 207, so far as the same relates to the forming of fur bats of any kind?

A. I have examined, and believe I understand it.

609 Q. 18. Please state how the same resembles or differs from the inventions described in the Wells reissue of Sept. 30, 1856, and the defendants' machine.

A. The machine described at page 194, etc., of the volume referred to, is much like the Wells, James, and Peck machine before referred to. It is intended to serve the same purpose as that machine, namely, the formation of a continuous web or sheet of fur. It differs from both the defendants' machine and that described in the Wells reissue, not only in the fact that it is in-
610 tended for the production of a different article, but also in the fact that it contains no former of a conical or other analogous shape; that it does not retain the bat on the whole superficies of the former, and in other respects not enumerated by me, as those already stated are sufficient to show that it is substantially different from the machine of the Wells reissue and the defendant.

Q. 19. Have you examined, and if yea, do you understand the machine described in the certified copy of a patent granted to Hezekiah S. Miller, for improvement in a machine for making
611 felt in the manufacture of fur hats, dated March 5th, 1839?

A. I have examined the copy, and believe I understand the machine.

Q. 20. How does the said machine correspond with or differ from the invention described in the Wells reissue of Sept. 30, 1856, and the defendants' machine?

A. His machine, like those of Wells, James, and Peck, Blanchard, and that described in the 13th volume of Newton's
612 Journal, serves to manufacture a continuous web or sheet of fibrous material, which is deposited upon a portion of a cylindrical surface, and never at any one time covers the whole surface. It has no formers of conical or analogous shape, and further has no exhausting apparatus for causing the fibre to adhere to the former by atmospheric pressure. I believe it to be substantially different from the Wells reissue and the defendants' machine, not only in the result produced, but also in construction and mode of operation.

Q. 21. Have you examined a certified copy of letters pat-
613 ent granted to William Fosket, for improvement in machinery for forming hat bodies, January 23, 1846? and if yea, state whether you understand what is therein described and represented.

A. I have examined the copy, and believe I understand the machine described and represented therein.

Q. 22. Will you state in what respect the said machine resembles or differs from the invention described in the Wells reissue of Sept. 30, 1856, and the defendants' machine, in construction and in principle or mode of operation?

614 A. The Fosket machine resembles the defendants' and that of the Wells reissue in construction, in the fact that it has a perforated rotating conical former.

2d. In that it is supplied with an exhausting fan for drawing currents of air into all parts of the cone.

3d. In that it has a feeding apron. It differs from them in construction, in that it has no rotating brush or picker for impelling a combined current of air and fur. It also differs in the fact that the cone is surrounded by a box or casing. It has for the purpose of disintegrating the fur what may be termed a mechani-
615 cal bowstring, and a pipe or tube leading from the neighborhood of the string into the box or chamber. It differs in mode of operation from the Wells reissue and defendants' machine—

1st. In that it does not effect the deposit of a bat by the agency of two distinct currents of air.

2d. In that the sheet of fur passing towards the cone approaches it in lines prependicular to the axis of the cone, instead of parallel to it, as in the other two machines. I have never seen a Fosket machine in operation, and therefore base my opinion on this

616 second difference of mode of operation on my judgment of what would result from its peculiar construction.

MONDAY, *October 26th*, 1857.

Q. 23. In answer to the 22d question, in specifying the differences in mode of operation between the Fosket machine and the plaintiffs' and defendants' machines, you have stated that it (the said Fosket machine) does not effect the deposit of the bat
617 by the agency of two distinct currents of air. Will you specify what are the two distinct currents of air to which you refer?

A. In both the defendants' machine, and that of the Wells reissue, the rapidly revolving brush or picker, with its immediately surrounding case in the one instance, and the two rapidly revolving pickers with their case or guard in the other instance, throw or impel a combined current of air and fur fibre towards
618 the former or cone. This fur-bearing current of air is one of the currents to which I referred in the answer to the 22d question, and the other current is that which enters into the perforations of the cone, being induced solely by the exhaustion of the cone.

Q. 24. Taking the specification and drawings of the Fosket patent before referred to, state whether the model Exhibit No. 3 corresponds therewith, or differs therefrom.

A. The drawings of the patent are imperfect, but there are certainly two things in the model which are not represented in the drawing. The first of these are the two apertures into the
619 chamber on each side of the pipe or tube which conducts the fur into the chamber. Taking other parts of the drawing as a guide, there are represented instead of these openings two solid blocks for holding the tube in position. The second point is, that the rollers pressing against the cone have a jigging motion in the line of their axis, no apparatus for giving such a motion being represented in the drawings or described in the specification, which latter only speaks of rollers which press on the bat during the process of its formation, and in giving this opinion I
620 suppose the conical frame of wire spoken of in the patent to be presented by the perforated metallic cone of the model, while the grass cloth cone of the model represents that on the outside of which the hat is to be formed. Neither description nor drawing show the direction of revolution of the snapper wheel. On the model this wheel draws the bowstring towards the chamber, and lets it fly back away from the chamber. There are also differences in the proportion of parts, but I do not know that they are worth mentioning.

621 Q. 25. How does the said model No. 3 correspond with the specification and drawings as to the location of the band

and wheel for rotating the cone, and as to the location of the fan for exhausting the cone, and as to the proportions of the apertures in the surrounding casing for the admission of air into the said casing, and also as to the proportions of the tube or pipe?

A. In the drawings and specification the band and pulley for rotating the cone are both inside of the chamber which sur-
622 rounds the cone, whereas in the model they are outside of that chamber below its floor. In the model the shaft of the exhausting fan has the same axis as the cone, the fan lying immediately below the cone, and the circle of the bottom of the cone being the eye of the fan, whereas in the drawings and specification the fan is shown as located below the feeding apparatus, with its eye in communication with the interior of the cone, by means of a trunk and chamber. The apertures in the casing of the model in the sides thereof are nearly double the size that they ought
623 to be if made in accordance with the drawings, the difference in size being in height; and the aperture in the rear side of the casing is of greater height than the others. The tube or pipe which leads into the chamber is wider than it ought to be if made in accordance with the drawing, and also of more than double its proper height if made by the same scale.

Q. 26. If made in accordance with the proportions of the drawing, and assuming that the bowstring impels a current of fur into the passage or tube towards the cone, and the cone not to be exhausted, on what part of the surface of the cone would the
624 fur so impelled impinge?

A. My opinion is, that the fur would never enter the chamber at all; but if the bowstring could throw it far enough, the fur would be deposited upon a ring or zone at the base of the cone if it revolved; and if it did not, upon a portion of such a zone.

Q. 27. What would be the proportionate length of such zone relative to the whole height of the cone represented in the drawing, still assuming the cone not to be exhausted?

A. I should judge less than one-fifth of its height.

625 Q. 28. Assuming the bowstring to be snapped in the direction represented in the model No. 3, in what direction would it tend to impel the fur, towards or from the cone?

A. I am not sufficiently familiar with the operation of a bowstring upon fur, to speak with any certainty. I should think it would throw it, if anything, away from the cone.

Q. 29. What current of air would a bowstring so operated generate?

A. On that point I should say that the current, if any,
626 would be outwards away from the cone, because the bowstring is moved slowly towards the cone, and flies back from it with considerable velocity.

Q. 30. Have you examined letters patent granted to Alva B.

Taylor for improvement in the manufacture of hat bodies, dated August 12, 1856? and if yea, state what the specification and drawings of the said patent represent.

(Objected to as new matter.)

A. They represent machinery for making hat bats upon a perforated exhausted revolving cone, on which they are afterwards hardened by jigging, and the machine has also a feeding-apron, nipping-rollers, and a rotating brush or picker partially surrounded by a case or trunk, the operation of which would be to impel a current of fur and air upon a cone; the direction of the sheet of impelled fur being in line passing through the axis of the cone, or nearly so, the plane of the sheet being parallel or nearly so to the axis of the cone.

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Q. 31. How does the machine described and represented in said patent resemble or differ from defendants' machine?

A. It is the same, except that in the defendants' machine a secondary revolving brush or picker is employed, and that the form of the cap or casing of the pickers is modified.

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Q. 32. What effect has such difference upon the mode of operation of such machine?

A. None at all.

Q. 33. By what means, if any, is the sheet of fur directed towards the cone in the machine described in the said Taylor patent?

A. By the cap or short trunk, lettered F in the drawings.

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Q. 34. Have you made any experiments with the view to determine the direction in which the fibres of fur move or are impelled, and by what forces they are moved? and if yea, specify where such experiments were made, and the result of them, and if you have made any diagrams in illustration thereof, produce and explain such diagrams.

A. I have made experiments for that purpose at the factory of the plaintiffs, in Frankfort street, in this city. The exhibit which I now hand you, marked J, or E S, was made by me, and the red lines thereon exhibit the track or passage of the particles of fur after they leave the mouth of the trunk, being impelled by the rotating brush expanding wider than the mouth of the trunk when they leave it, and being deflected and finally held upon the perforated cone by the current induced by the exhaustion. In these experiments the whole machine was precisely in its ordinary working condition. The exhibit which I now hand you, marked K, or E S, shows the direction of the fur fibre as impelled and deflected when a board was placed in the mouth of the trunk, the machine being in other respects as in ordinary work-

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and Exhibit L, or E S, which I now hand you, shows the direction of the fibres as impelled and deflected when the cone stood at one side of the trunk, with the centre line of the bot-

tom of the trunk at a tangent to that part of the cone opposite it, the machine being otherwise as usually worked. These exhibits are not made upon a scale, but I believe represent substantially and fairly the experiments made by me, and the references on the drawings were written by me, and are, I believe, correct.

632 Q. 35. In the series of experiments referred to in your last answer, did you observe, and if yea, what were the practical results?

A. Well, in the first series, bats, as in the usual operation of the machine, and in the other two series, I made, and had hardened, one bat for each experiment, giving them to Mr. Stilwell immediately after they were finished, and I have not had possession of them since. The bats are now produced, and Exhibit M is the one made with the machine with the stick, N, in the mouth of the trunk, and Exhibit O is a bat made with the cone placed at

633 one side of the mouth of the trunk shown in Exhibit L; both bats are slightly hardened by hand after being removed from the cone.

Q. 36. How did the bats made by experiments, Exhibits K and L, compare with the bats made on the machine in its usual condition, as in Exhibit J, as to texture and quality?

A. I am not a practical hatter; but as far as I can judge, they are about as good, both in texture and quality.

634 Q. 37. Have you examined the drawings of the defendants' machine, marked Exhibits 10 and 11, with a view to determine the direction of the tangent common to the two picker-rollers relatively to the axis of the cone when the upper picker-roller is set as far forward as the construction of the machine will admit? and if yea, state whether such tangent, when produced, will pass above or below the axis of the cone.

A. I have examined them, and such tangent would pass below the centre of the cone.

635 Q. 38. If the upper picker-roller of the defendants' machine were so set as to make the tangent common to the two picker-rollers, when produced, pass through the axis of the cone, what would be the effect of the impelled currents of fibres on the previously deposited fur?

A. My opinion is, that they would practically have no effect at all, as this is the line of travel of the impelled current in the ordinary use of the Wells reissue machine. If the impelled current had any effect upon the fibres already deposited, it would

636 be to drive them closer to the surface of the cone.

Q. 39. In which case would the fibres already deposited on the cone be most likely to be disturbed by the fibres approaching the cone when the picker-rollers are set as called for in question 38, or when set as in Exhibits 10 and 11, and give reasons for your opinion?

A. They would be most likely to be disturbed, if at all, when the machine is set as represented in Exhibits 10 and 11, as the force of the impelled fibres would then tend to knock the deposit of fibres off instead of forcing them more firmly on; but I do not believe that there would be any practical disturbance, as,
637 even in this case, I have observed none in the experiments I have made in the plaintiffs' shop, with the main line of the impelled current tangential to the cone.

Q. 40. Would the cone, if not exhausted, and with the position of the picker-rollers as represented in figures 10 and 11, have any, and if yea, what influence on the line of travel on the mass of fibres?

A. I think it would tend to elevate them slightly upon
638 the position they would occupy if there were no cone there, the cone itself acting like any other solid mass in deflecting a current.

Q. 41. In calling your attention to the T. R. Williams English patent, published in the London Journal, vol. 10, and his American application for the patent of 1840, state how the same resembles or differs from the invention described in the Wells reissue of Oct. 7, 1856.

A. As I understand the invention of Wells, it consists in a process which had for its result a bat sufficiently hardened to
639 admit of handling, felting, and sizing; and this result is obtained by a process of which the first step is to deposit fibres of fur upon a cone by the action of two currents, and the fur approaching the cone in line parallel to its axis; the second step in the process being to harden that bat thus formed in a proper manner to such an extent as will admit of its safe removal. And I find in that patent one special or particular method described as suitable for giving to the bat the required consistency as aforesaid.

In the publication of Williams' patent in Newton's London
640 Journal, I have before stated that I do not find such a method of depositing the bat as constitutes the first step in the process which is set forth as the invention of Wells in the reissue referred to in the question, and the same is true of the method of depositing a bat set forth in the American application aforesaid. In the publication aforesaid I find no method described of hardening the bat while on the cone, in the sense that I understand that term, my belief being that it is applicable only to processes in which the peculiar shape of particles of wool or
641 fur is taken advantage of to consolidate a bat by the interlocking or interweaving of the particles; but on the contrary, I find in the publication a method described of consolidating the bat by agglutination through the intervention of some foreign substance which forms a cement between the particles.

In the Williams application, I find described the same method of depositing the bat as is set forth in the publication, and the same general method of consolidating the bat by agglutination; and I also find in the cancelled parts thereof a statement
642 that if the forms are required for felting, they are to be removed to another machine, where they undergo the process of basoning or hardening whilst between the forms. I have been informed that basoning, in the usual sense of the term, implies exposure to steam without condensation, which would be merely equivalent to a heating of the particles. But in a subsequent patent, granted to one Wells, and published in the 13th vol. of Newton's Journal, conjoined series, I find a process set forth as basoning, in which condensation of the steam and friction
643 are brought into play for hardening hat bodies made by winding a bat upon a conical former.

My opinion, therefore, is, that the Williams publication describes neither step of the process which constitutes Wells' invention. I also believe that the first step of the process set forth in the Williams application is substantially different from that set forth in the Wells reissue, and that the second step is also substantially different, if my information be correct; but such would not be the case if basoning was the process defined in the Wells publication of the 13th vol. of Newton aforesaid; but on
644 either supposition, the process, as a whole, would be substantially different from that set forth in the Wells reissue, as there is a substantial difference in the first element of the combined process, which of course renders the process different as a whole. It is also to be observed, that even had Williams in his application meant the process described in the 13th vol. of Newton's Journal by Wells, that even then such process would be practically inapplicable to a bat deposited upon an exhausted cone, as Wells sets forth, in vol. 13, the partial saturation of his
645 bat with water derived from condensed steam, prior to the operation of basoning, and also speaks of the removal of cones with the bats on them, as removed without protection by a covering cone, and no such removal could be practised with a bat made by deposition.

I am clearly of the opinion that the process set forth in the Wells reissue is, on the foregoing ground, substantially different from that set forth either in the Williams application or publication.

646 (Hearsay testimony of witness objected to.)

Q. 42. Do you find in said Williams's application any description, and if so, what description, of the mode or modes of basoning or hardening?

A. I find none at all.

Q. 43. In the Wells description, in the 13th vol. of the London

Journal, to which you have referred, what is the mode there described by Wells of forming the bat on a cone?

A. By winding a web of hardened bat around a conical
647 former.

Q. 44. Is the hardening referred to in your last answer applied to the web of fur before it is wound upon the cone, or after it is wound upon the cone?

A. Before.

Q. 45. What would be the consequence of removing the cone from the exhaust with the bat formed by the deposition of fur fibres, without adopting some mode of protecting such bat before it is hardened?

A. The slightest motion of the cone through the air
648 sweeps off the fur, and disorganizes the bat.

Q. 46. How do you know that?

A. By actual experiment.

Q. 47. How is that consequence prevented in the reissue of the Wells patent of Oct. 7, 1856, and in the mode of procedure practised by the defendant?

A. By covering with cloths and an outer cone in the Wells process, and by keeping up the exhaust, and consequently the pressure of the air, in the process consequent upon the use of the defendants' machine.

649 Q. 48. How does the mode of hardening described in the Blanchard patent before referred to differ from the invention described in the Wells reissue of Oct. 7, 1856?

A. Blanchard describes the mode of hardening applied to an endless bat, instead of to a conical bat, for a hat body; he therefore sets forth nothing at all like the first step of the combined process described in the Wells reissue.

Q. 49. Have you examined a certified copy of letters patent
650 granted to Wells, James & Peck for improvement in machinery for making hat bodies of fur, dated Sept. 20, 1857? and if yea, state how the method of hardening therein described resembles or differs from the Wells reissue of Oct. 7, 1856.

A. I have examined the patent sufficiently to see that it sets forth no method of depositing a bat upon an exhausted cone, but shows an apparatus for making a double bat, by winding an already formed web of fur around such cone, and that it also sets
651 forth the application of steam, which condenses upon the bat during the process of winding. They set forth no method of applying friction to the bat, and the process is entirely different in both steps from that set forth in the Wells reissue in the question.

Q. 50. Have you examined a certified copy of letters patent granted to Stephen Hurlbut for an improvement in the manufacture of hats by hardening the body on the cone, dated June 13,

1831? and if yea, state whether it resembles or differs from the invention described in the Wells reissue of Oct. 7, 1856.

A. I have examined it, and Hurlbut's process is for forming a bat by means of winding a web around the cone, the bat being afterwards exposed to the action of condensed steam, and being also padded by an outer surrounding cone. Hurlbut's process in the first step thereof, and as a whole, is substantially different from that set forth in the Wells reissue, and I doubt the practical ability of his method of hardening even, considered as a process for hardening solely.

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Q. 51. State wherein the Fosket patent, before referred to, resembles or differs from the invention described in the Wells reissue of Oct. 7, 1856, and the method of hardening practised by the defendants, and give your reasons fully.

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A. In my opinion the process described in the Fosket patent differs entirely and substantially from that set forth as the invention of Wells in the reissue of the question, and from that practised in the operation of the defendants' machine. I have already stated my opinion as to the substantial difference for the method of depositing a bat by Fosket's machine, as contrasted with the method of the defendants' and the Wells reissue, and I further believe that the method of hardening set forth in Fosket's patent would be practically inoperative, as it sets forth a mere dry pressure upon the several layers of the bat without jiggering, and describes no way in which even such a pressure might be applied over the whole surface of the bat. Fosket, therefore, in my opinion, describes no process by which the bat could be sufficiently hardened for safe removal from the cone, and this pressing process is substantially different from the hardening process of either the Wells reissue, or that which results from the operation of the defendants' machine, which certainly doth harden the bat sufficiently to admit of safe removal.

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Q. 52. Assuming the conical roller in the Fosket machine to have a vibratory motion in the direction of its axis, as represented in model 3, how then would it resemble or differ from said Wells' invention, and the defendants' method of hardening?

A. Such change would make no difference in the first part of Fosket's process by depositing the bat, and although it might harden along the straight part of the conical former, it still would harden only in successive layers, which would never afterwards felt so closely together as the parts of which each layer were composed, and would furnish no method of hardening the tip of the bat. I should consider his process, even with the addition supposed in the question, substantially different from the processes resulting from the operation of the defendants' apparatus, or that of the Wells reissue.

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Cross-examined by Mr. Harding, Counsel for the Defendants.

X 53. What's the difference between the Wells reissue of Sept. 30, 1856, and that of Oct. 7, 1856?

A. The one is a patent for a method of depositing hat bats, and the other is a patent for a process which results in the production of a bat made by deposition sufficiently hardened to be removed from the cone. This is a general statement of the difference.

658 X 54. Is the patent of Sept. 30, 1856, a patent for a process?

(Question objected to, as calling for matter of law on the construction of the patent, and not for a matter of fact on the description in the patent.)

Question withdrawn.

X 55. Is the invention set forth in the reissued patent of Sept. 30, 1856, a process?

(Objected to for the same reasons as question 54.)

659 A. My opinion is that the invention set forth is the mode of operation resulting from the use of a machine substantially such as described.

X 56. Can you tell from reading a specification whether the invention set forth by that specification consists of a process or a machine?

A. If you will show me any particular specification I will try to give you an answer. I have sometimes known persons who ought to be better informed than I am differing much in opinion on such a point.

660 X 57. Can you tell me whether the invention set forth in the specification of the reissued patent of Wells of Sept. 30, 1856, consists in a process or in a machine?

A. I have, in answer to question 55, set forth my opinion as to what invention set forth in that patent is, namely, the mode of operation resulting from the use of a machine; I should not call it a process.

X 58. Does the said invention consist in a machine?

A. I have already stated my opinion of what it consists.

661 X 59. Can you tell me whether or not it consists in a machine?

A. I should say that it consists in a machine, provided that machine is so constructed as to work out a certain result by a particular mode of operation.

X 60. Could a machine be constructed which should involve or contain the whole of this invention, provided said machine was never used?

A. The question is rather above my comprehension, but I think it could, in the same way that an engine with a cut-off ready

662 to use, though never used, still having the capacity of cut-

ting off steam when desired, would be an infringement of a patent for such a cut-off.

X. 61. As you have volunteered your opinion as to what might constitute an infringement of a patented invention, will you please inform me whether or not a machine could not be constructed that should be an infringement of the Wells patent of Sept. 30, 1856, without ever being used at all?

663 (Objected to as calling for information on a matter of law.)

A. I have answered that question substantially in my last answer, for if a machine contained the invention it would of course be an infringement.

X 62. Do I understand your last answer to be equivalent to the word yes?

(Objected to for above reasons.)

A. Yes, and a little more.

X 63. Could or could not a machine be constructed which would be an infringement of the Wells reissued patent of Sept.

664 30, 1856, provided such machine was never used?

(The same objection as before.)

A. I have already answered that question.

X 64. Question repeated.

A. Answer repeated.

X 65. Is there any machine, the construction of which would constitute, in your opinion, an infringement of the reissued patent of Sept. 30, 1856?

665 (Objected to as before, the question of infringement being a mixture of law and fact.)

A. If you mean by construction, when constructed, I have already answered the question in the affirmative; I think the defendants' machine present is such a machine.

(The last clause of the answer objected to as a volunteer of the witness, and not responsive to the question.)

X 66. Do you understand that the invention contained in the Wells reissued patent of Sept. 30, 1856, consists in any-

666 thing more than a machine?

A. I have already told you twice, in what I think it consists.

X 67. Question repeated.

A. I have already stated in what the invention consists. Please define the word "more," in the connection you use it, and I will try to answer you further.

X 68. By "more," I mean the idea which would be conveyed by the use of the word "else," the word "further," or the words "additional to."

667 A. Nothing in addition to the machine, but a machine

whose operation would result in a certain method of forming bats.

X 69. Do I understand by the last answer, that the invention consists in a machine?

A. In a machine whose mode of operation would result in a certain method of forming bats by deposition.

X 70. Is the machine to which you have alluded made up of parts?

A. Of parts properly combined and arranged with respect
668 to each other.

X 71. Are these parts mechanical parts?

A. The parts are mechanical, if you mean by that word something appertaining to a machine.

X 72. Does the machine consist of mechanical pieces?

A. Yes, properly arranged, if you use "mechanical" in the same sense.

X 73. Does the specification of this patent specify or mention any mechanical pieces or parts as entering into the formation of this machine?

669 A. I do not know whether the patent uses the "phraseology" of "mechanical parts," but it certainly does describe certain parts which together go to make up a machine.

X 74. Please state what parts the specification mentions as leading or important parts entering into the constitution of this machine.

A. It does not pick or point out any parts as leading or specially important. I can name what I consider to be so, if you want me to.

670 X 75. Please state what parts exist in said machine as described in the patent, and which, in your opinion, are important pieces in the machine as therein described. In answering this question, please name the parts without now stating their functions respectively.

A. I cannot answer without at least indicating their functions; the parts are feeding apparatus, nipping apparatus, rapidly revolving brush or picker, a trunk, all properly arranged and combined; and, properly arranged with respect to them, a rotating perforated cone and an apparatus for producing a partial
671 vacuum within that cone.

TUESDAY, 27*th Oct.*, 1857.

X 76. Is not the hood one of the mechanical devices which enter into the constitution of the machine invented by Wells, and set forth in his reissued patent of Sept. 30, 1856?

A. It is a mechanical device set forth in the reissue, but not as an essential, in my opinion.

X 77. What is the result or product of the machine in-
672 vented by Wells, and set forth in the specification of Sept. 30, 1856?

A. A hat bat, having such relative thickness of parts as may be desired.

X 78. Does the patent set forth any mechanical device for varying the relative thickness of the bat? If so, please quote the words of the patent which describe the device or devices for effecting such result. I mean now to ask you for the device whose special and immediate function is, the regulation or distribution of the
673 fibres so as to vary the relative thickness of the bat in its parts.

A. By relative, in the last answer, I did not mean to imply necessarily a difference of thickness; the mouth of the trunk is not by the patent confined to exact size or shape, and I know by experience that slight changes in it will alter materially the distribution of fibres upon the cone. The patent sets forth a hood as the apparatus for making the bat thickest at the brim, such thickness being desirable, and speaks of a cam for moving the
674 hood when further diversity of distribution is required. Referring to the trunk, he says: "Its top is elevated and sides contracted to make the delivery aperture nearly of the form of the cone, but narrower and higher." Speaking of the hood, he says: "This hood is hinged to the upper part of the delivery aperture of the chamber, and is connected with an eccentric, t, by means of a cord, u, and bell-crank, u 1, that passes over a pulley, r 2; so that each revolution of this eccentric carries the hood up and down to direct the discharge and distribute the fibres
675 on to the cone; a greater thickness being desirable in the parts of the bat which form the brim than on the tip and crown; and when it is desired to still further diversify the distribution of the fibres, a cam can be substituted for the eccentric." He further states that "the hood may be operated by hand instead of machinery, thus substituting the attention, skill, and cost of an operative, for the positive regularity and cheapness of mechanical movements." Those are the devices, but he does not limit himself specially to them.

X 79. What device does he describe which may be sub-
676 stituted for the hood? Quote the language of the patent describing the device which may be so substituted.

A. I have not said, as the question would seem to imply, that he specifically described any substitute; but he does say: "Other modes may be devised, operating on the same principle, or having the same mode of operation, and only differing therefrom in the substitution of equivalent means."

X 80. If the hood be the only specific device described in the patent, the specific function of which is to vary the relative
677 thickness of the parts of the bat, and a bat whose parts are of varied relative thickness be the result produced, why,

then, in mentioning what were the important features in the machine, as described in the patent of Wells of Sept. 30, 1856, did you omit to mention the hood?

A. Because I have never said that the hood was the only device described which would vary the relative thickness of the bat, and have before stated, I think, that by the relative thickness of parts, I did not mean to imply different thickness necessarily.

678 X 81. Is a bat of different thickness at the brim and at the tip an important feature of the result produced by the Wells machine as described in his patent of Sept. 30, 1856, or is it not?

A. Such a bat may be an important feature, and may not. The great characteristic of the machine is, that it delivers the fibres in a sheet, parallel to the axis of the conical former, thus affording a capacity for, or facility of, distribution, which may be taken advantage of when desired. I believe that I have answered substantially the same question before, when put by Mr. Gif-

679 ford.

(All the last part of the answer is objected to, as not responsive.)

X 82. Question repeated, and the witness is reminded that he is not asked what may, or may not, have been the case. Neither is he asked what is the characteristic of the machine. Nor is he asked to refer to former answers, which he considers to have been in reply to questions substantially the same.

A. When a bat of such thickness as is described in the

680 question is desired, the capacity of the machine to produce it is important; when one thick at the tip is desired, the capacity to produce it is also important, and the result is, in either case, important to him who desires a bat of either kind, or one of equal thickness throughout, or thinner and thicker at various points of its length. I put in my former answer what I conceive to be the characteristic of a machine, in order to make my opinion clear as possible, and to show my views of the machine; a categorical answer could not be given to your former question.

681 X 83. Can you discover, by reading the specifications, whether a bat of different thickness at the brim, and at the tip, is an important feature of the result produced by the Wells machine as described in his patent of Sept. 30, '56?

A. No further than I have already stated.

X 84. Do I understand you to say that a bat thicker at the brim than at the tip is not mentioned in the specification as an important feature in the result produced? Please observe that this

682 question, like several previous questions, relates only to the result produced.

A. The words of the patent are, after describing the cone, "a greater thickness being desirable in the parts of the bat which form the brim than on the tip and cone." I do not consider tha

he confines himself to such a bat as always being important, and must refer you to what I have said before, that this result is important to him who needs a particular bat, but not necessarily an important feature in the result produced.

X 85. Do I understand you to say by the last clause of
683 your last answer that a bat thicker at the brim than at the tip is not necessarily an important feature in the result produced by the Wells machine as described in the reissued patent of Sept. 30, 1856?

A. Yes.

X 86. Will you please quote the language of the patent which indicates that a bat whose thickness is greater at the brim than at the tip is not an important feature in the result produced?

A. The specification, like others, does not set forth in
684 words, or in expressed terms, what are not the important features of the invention or the result produced.

X 87. Does the patent set forth what the inventor believed to be the important feature of the result produced?

A. He states about the result, that his invention was one "by which the required and much desired practical result was obtained," and speaks in his claim of obtaining the "required thickness of bat," and he uses the first quoted paragraph after stating, or after noticing the old process of bowing; and another, which I
685 suppose to be descriptive of Williams's figure 6, so often referred to, by which no regulation whatever of thickness is practicable. The general language of the patent, although there is no express phraseology, leads me to believe that he thinks the important result to be a hat-bat which will suit the wishes of the party desiring it, as to relative thickness, whether equal or unequal.

X 88. Does he not expressly state that hat bodies are required to be made thick at and near the rim, and thin along the
686 crown and tip, that the required strength may be given where it is required without making the hat too heavy, and at too great a cost of material?

A. He does in the preamble; but I do not see that he in any place confines himself to a bat of the relative thickness set forth in the question as the only result of his machine.

X 89. Does he define the words "required thickness of bat," which are in the claim, in any other part of the patent except the passage quoted in the last question? and if so, quote the words of the patent by which he so defines the words used in the
687 claim. (I do not ask for anything but a quotation from the patent in reply to this question, or a statement whether or not there be in the specification any language defining the words "required thickness of the bat," other than the words quoted in the last question.)

A. To my mind the words quoted in the question before last do not define the words "required thickness" employed in the claim.

X 90. Without admitting by your answer that those words do or do not define the language of the claim, "required thick-
688 ness of the bat," answer the last question.

A. I cannot answer the question 89 without making the admission, but can state that there is in the patent no paragraph defining the express meaning of the words of the claim.

X 91. Does he not state two reasons why a practical result could not be obtained before his invention?

A. Yes, more than two.

X 92. Was not one of the reasons so stated by him, the invent-
or, the fact that hat bodies are required to be made thick
689 at and near the rim, and thin along the crown and tip, that the required strength may be given where it is required without making a hat too heavy, and at too great a cost of material, and that this disposition of the fur cannot be done by the plan which you have referred to as Williams's plan?

A. He does state that the Williams plan failed, because the fibre was not thrown and properly directed for distribution, and without such throwing and direction it is evident to me that
690 the thickness of a bat cannot be regulated in the manner set forth in the question.

X 93. You were not asked for your opinion, but to state the reasons given by the patentee, and with this observation the question is repeated.

A. The patentee gives as a reason why Williams's plan would not work, that the fibres are not properly thrown and directed for distribution on to the cone or other form, such want of direction preventing the bats from being made thick at and near
691 the rim, and thin along the crown and tip.

X 94. Question 92 repeated.

A. He does state that the want in Williams's machine of a proper throwing and directing of the fibres was the reason why Williams's machine failed in making a hat-bat thick and thin, as in the 92d question.

X 95. Will you swear that you cannot see in the patent the statement in the 92d question? and if you can find such statement, please say whether or not it is there given as a reason why
692 the Williams machine failed to make practical hat bodies.

A. As I have already said, my distinct understanding is that the patentee gives as the reason why Williams's machine would not work practically, was because the fibres were not properly thrown and directed.

X 96. How many times have you made affidavits or given testimony as to what constituted the invention of Wells for forming hat bodies?

A. I am not certain, but I think once before the reissue, when his invention was differently set forth and claimed, and I
693 think twice or thrice since the reissue.

X 97. Is the machine differently described in his original patent to what it is in the reissue? My question relates to the machine.

A. The special machine described in the patent has the same description, but the other parts of the specification are different.

X 98. Did you make an affidavit in the suit of Burr vs. Taylor before the reissue was granted?

694 A. I believe I did.

X 99. Did you state in such affidavit that a machine was described in Wells' original patent, consisting principally of six parts, and did you not mention as the fifth of those parts a hood operated either by hand or by a motion derived from the machine?

(Objected to, unless the affidavit referred to be produced.)

A. I have no distinct recollection of the fact, but have but little doubt that I did so, basing my affidavit, as I always do,
695 upon the points set forth in the specification of claim of the original patent, the claim generally furnishing the most distinct if not the only guide of the patentee's idea of the scope of his own invention.

X 100. If you then thought the hood to be a principal part of the machine as described in the patent, and if the special machine is described in the same way in the original and reissued patent, will you please state why you omitted to mention the hood as a principal part of the special machine described in the reissued patent.

696 A. Because in both cases I made up my judgment as to the special parts of the machine by the nature of the invention set forth in the two patents. I have known of a patent in which a propeller and a steam-engine were both described; as originally granted, the claim was on the engine; as reissued, the claim was on the arrangement of the propeller. In setting forth the specialties of the contrivance of the original patent I should certainly have left out of view the propeller, while in setting forth the specialties of the reissue I should just as certainly have
697 specified the propeller and left out the engine, and I have pursued the same course in the present case.

(Objected to as a volunteer.)

X 101. Has not the machine described in Wells's reissue of Sept. 30, 1856, a capacity which may be taken advantage of to distribute the fur unequally in lines passing from the base to the tip of the cone?

A. Yes.

X 102. Has it not in addition to this, a mechanical means to

distribute the fur unequally in lines passing from the base
698 to the tip of the cone?

A. Yes, two of them, namely, the hood and the orifice or mouth of the trunk, depending upon the precise shape of the latter.

X 103. Do you not consider the mechanical means by which the capacity of the machine is rendered available, to be as much an element of the machine as its abstract capacity?

A. The capacity of the present machine is a positive real thing, arising from the direction of the sheet of fur, and not an
699 abstraction, and I do not consider the means of rendering it available to be as important an element, or as much an element as the elements and arrangements which give the capacity.

X 104. How does the mechanical element, the hood, compare with the capacity itself as an element?

A. I do not understand that question, unless it means the same thing as that I have already answered.

X 105. Does not the Wells machine differ from the Cowperthwaite machine from the fact that the Wells machine has
700 a mechanical means which distributes the fur unequally in lines passing from the base to the tip?

A. The method of distributing the fur described by Wells is mechanical, if shape be considered a mechanical means; and I am informed that the means resulting in the same mode of operation in the Cowperthwaite machine is the unequal distribution of fur on the feeding apron. I should not call that, strictly speaking, a mechanical device, although the shape of the heap of fur on the feeding-belt is the thing which regulates the distribution.

701 X 106. Strictly speaking, has the Cowperthwaite machine any mechanical means for regulating the distribution of the fur as inquired in the last question?

A. None other than that stated in the last answer, which I there stated I should not call, strictly speaking, mechanical.

X 107. Question repeated.

A. The Cowperthwaite machine has only the means for distribution, which I have before pointed out, and have already
702 stated twice, that I do not consider it strictly mechanical.

X 108. What do you understand to be the width of the sheet of fur which would be thrown by the machine described in the patent of Wells—I mean as compared with the altitude of the cone?

A. The sheet of fur at the instant of leaving the mouth of the trunk, is in lines parallel to the axis of the cone of greater length (or width used in the same sense) than the length or altitude of the cone.

X 109. You have said that there are two currents of air opera-

tive in the Wells machine in forming the bat; please state
703 whether you mean by this that the fur is carried at the same time in two distinct currents, or that there are two agencies making one current.

A. The fur is first set in motion, and carried by one distinct current; it is then brought under the influence of a second current, namely, that entering the cone, and pursues a direction which is a resultant of the two currents.

X 110. How far does the current from the picker extend in front of the picker; and at what point does the current towards the exhausted cone commence?

704 A. It is impossible to say. The point varies not only with the positive velocities of the two currents, but with their relative velocity.

X 111. How far did the currents of air, caused by the exhaust cone in the machine experimented upon by you, extend?

A. I cannot say.

X 112. How far, in your opinion, does it extend?

A. I have paid no attention to that point, and cannot say; its extent would vary with the velocity of the fan, with the
705 size of the apertures in the cone, and the quantity of fur upon the cone. I directed my observations to the manner in which it modified the other current, and not to its extent, where it was performing no part in the operation of the machine.

X 113. How far does the patent state that this current extends?

A. So far as to influence the impelled current, even up to the pickers.

706 X 114. If that be the case, would not the fur fibres, immediately after leaving the picker, move under the influence of one current, which would be the result of the two agencies, to wit, that induced by the rotating of the brush, and the partial vacuum in the perforated cone?

A. They might theoretically, but do not practically, in the operation of the machine; for if they did so move, the sheet would grow thinner and thinner as it leaves the trunk mouth, whereas, on the contrary, the sheet grows thicker after the fibres leave the mouth of the trunk.

707 X 115. Are not the fur fibres under the influence of the single current induced by the rotating brush and exhaust cone immediately after leaving the brush or picker?

A. No; there is no such effect in the actual working of the machine as far as I could see, and I observed carefully.

X 116. Did you make your observations and experiments on the machine described in the reissue of Wells's patent, or on a machine known as the Burr and Taylor machine?

A. On a machine commonly known as Burr and Taylor's
708 improvement on Wells's, and with substantially the same

length of trunk and position of cone as is represented in the drawings of the Wells reissue.

X 117. Have you based any opinion which you have expressed on the experiments made with that machine?

A. Yes; and on observations of the practical working of such machines and others constructed in accordance with the drawings of the Wells reissue.

X 118. Whence did you derive your theory as to the two currents and the operation which you have stated in your ex-
709 amination in chief to be operative on the fur fibres in the Wells machine?

A. From theory derived from general observation, from experiments with experimental machines, from observation of the actual operation of the machine of the reissue, from the language of the reissue itself, where it speaks of throwing the fur, of a current of impelled fur to the cone, and of holding the fibres to the cone, and from actual working of and experiment with the Burr and Taylor improvement, and also from observation of the working of
710 machines having the same mode of operation as the defendants'.

X 119. Is it essential to the action of the Wells machine that the picker or brush should carry the fibres, or project them beyond the point at which the current of air, induced by the exhaust cone, enters the trunk, provided that the current induced by such exhaust be sufficient to carry the fibres on to the cone?

A. I suppose you mean the current entering into the trunk close by the pickers, and at the bottom thereof. I have before
711 stated, or meant to state, that there is no such current entering the trunk at that point in the practical operation of the machine; and even if it were possible to make one enter there, induced by the exhaust alone, I do not believe that a bat could be made by such current alone, but, on the contrary, that the current generated by the picker is necessary to its formation.

X 120. Why do you think it impossible for such a current of air to enter into the trunk close by the pickers and at the bottom thereof, induced by the action of the exhaust cone?

712 A. Because the exhaust current is too weak to reach to such a distance, and because the picker takes, to form its own current, all the air that it can get through that hole, and because the velocity of the current, as it leaves the picker, is, I should think, greater than the velocity of the other current when it enters the cone, and this is its point of greatest velocity.

X 121. Please examine figure 3, annexed to the reissued patent, and state whether a current of air does not enter at the point "N," induced partially by the rotation of the brush, and partially
713 by the exhaust cone, and that it is this current so entering

which receives the fibres as they leave the revolving brush and carries them forward through the trunk to the cone.

A. I have looked at the figure, and, as I have before stated several times, now reply again that I do not believe any current, practically speaking, induced by the exhaustion of the cone, enters that point during the operation of the machine; such answer renders unnecessary an answer to the last branch of your ques-
714 tion, as there is no joint current produced partially by the action of the brush, and partially by the exhaust at that point.

X 122. Have you ever seen hats made by hand with a bowstring?

A. Not that I remember, as I stated yesterday.

X 123. Do you know, practically, how a bowstring acts in disintegrating fur or in impelling it?

A. Of course not practically; the previous answer shows that.

X 124. Do you know which direction the fur fibres move
715 when struck by the bowstring—in the direction in which it is pulled, or in the direction in which it rebounds?

A. Practically, I know not, but I have an opinion that it depends upon the shape and inclination of the surface on which the fur lies.

X 125. On what then are your opinions, as to the operations of the bowstring in the Fosket machine, based?

A. As to the direction of the current of air produced by the string, by firing with a common bow and arrow, and as to
716 the direction of the fibres from the position of the string and the shape and inclination of the surface which it strikes in Fosket's machine; and I stated in my direct examination that I was by no means certain as to the truth of my supposition on the latter point.

X 126. Suppose a bowstring were placed in the position of the brush in figure 3, and the fur supplied to it by a proper nipping apparatus, and that air entered at the point "N," induced wholly or partly by the exhaust cone, and that the fibres of fur, as
717 laid or disintegrated by the bowstring, were met by the current of air so entering and carried through the trunk (figure 3) to the cone; would or would not such machine be substantially the same in principle and mode of operation as the machine described in the Wells reissue? I suppose in my question that there are no other agencies to produce the current, except the bowstring and the exhaust cone.

A. I do not think that such a machine would work at all.
718 I cannot give any other opinion about it.

X 127. Suppose that the trunk or passage in the Fosket machine, like that in the Wells machine, gradually change so that at its rear end its section was like the section of the Wells trunk,

and that the hood was attached thereto; would such machine be substantially like the Wells machine?

A. Such a machine would also, in my opinion, not make a bat at all, and therefore be unlike anything that would make one.

X 128. Why would neither of these machines make a
719 bat?

A. Because in the first one you would have nothing to carry the fur to the cone; and in the second one, supposing the pipe or tube to be so short that there would be a current entering its mouth, I do not think that it would ever get the fur up to the top of the cone.

X 129. Suppose a picker with a case was substituted for the Fosket bowstring, and the nipping apparatus arranged so as to properly present the fur thereto, the other parts of the machine being as in model 3; would such a machine be substantially the
720 same as the machine described in the Wells reissued patent?

A. I should like to see such a machine before answering positively; I might change my mind after seeing it. I should think that it would differ from the machines of the Wells reissue, unless it should turn out that the plane of the sheet of fur was in some way or other deflected, so as to be parallel to the axis of the exhausted cone.

X 130. Suppose it should turn out that the currents of air entering into the elongated opening at the bottom of the cas-
721 ing in model 3, so modified the other currents that the fur was deposited upon the revolving cone picker thicker at the brim than at the tip, what would be your opinion then?

A. The same as before, so long as the sheet of approaching fur, in its general direction, was not parallel to the axis of the cone.

X 131. In the Fosket machine, if the fur fibres introduced by the trunk or tube are so deflected by the currents entering
722 in at the side of the casing, that the fur would be deposited on the revolving cone thicker at the brim than at the tip, and so as to form a properly proportioned bat, would not the sheet of approaching fur be deflected so as to approach in a plane parallel to the axis of the exhausted cone?

A. I believe not.

X 132. Does not the American patent of Williams set forth a machine in which the fur is thrown by the action of the two currents moving towards the surface of a revolving perforated
723 exhausted former, in direction parallel to the axis of said revolving cone?

A. In the machine which has a cylindrical former, one current is thrown above the surface of the cylinder, and parallel to its axis, and the other current deflected down upon the cylinder.

X 133. Suppose the portion of the casing removed, and a cone

with its axis parallel to the sheet of fibres so thrown were placed instead of the cylinder, and that said cylinder was exhausted through its base, and the packing was removed; would such
724 machine be substantially the same as the Wells machine?

A. If the hole in the fan were shut up also, it would, provided the direction of the impelled current and the relative intensity of both currents was properly regulated, and the cone was sufficiently shorter than the length of the picker.

X 134. In answer 11, I understand you to say that the term section of a cone, as used in the patent, means any portion of the circumference of the cone less than the whole; if so, could
725 ninety-nine hundredths of the circumference of a cone be a section of the cone within the meaning of the patent as you understand it?

A. Yes, if it extended the whole length.

X 135. Would a machine which deposited the fur upon ninety-nine hundredths of the cone be substantially a different machine from one which deposited it upon the whole circumference of the cone?

A. If you could make either of such machines having the same mode of operation set forth in the patent, (which I doubt
726 to be possible, unless at least two distinct machines were applied to one rotating conical former,) I do not think they would be different machines; two sets of trunks playing upon one cone, so as to deposit over the whole surface, I should consider to be substantially identical with the machine described in the patent.

X 136. Did you not make an affidavit in the case of Burr against Taylor since the date of the reissue of the patent of Wells?

(Question objected to, unless the affidavit referred to be
727 produced.)

A. I probably did.

X 137. Did you not say that in the reissued patent of Wells there were described, among other things, "a cone revolving and perforated, so supported in relation to the cylinder and trunk that the fur from the rollers is delivered upon a narrow section of its whole circumference, such section being continually changed in consequence of the rotation of the cone?"

A. I have no doubt that I did so testify, as I have, since
728 I have become better informed by experiment, and prior to this time, thought of my error in describing the section as a narrow one, which expression would seem to imply a very small portion of the section of the cone.

X 138. When did you discover your error?

A. I cannot state the precise time—some time since.

X 139. Since this suit was commenced?

A. I don't know when this suit was commenced, not having been informed of it—it was some time ago that I discovered
729 my error as to the degree of width of deposit.

X 140. Suppose you contract the mouth of the trunk in the Wells machine; would not the section of the cone on which the fur is deposited be contracted?

A. If you mean contraction in the sense of narrowing, it would, but not in the same proportion.

X 141. Does not the width of the trunk determine, in a great measure, the width of the section on which the fur is de-
730 posited?

A. It does in a measure, but the relative strength of the currents have also a material influence.

X 142. Does the specification of the Wells reissue of Sept. 30, 1856, state that the fur fibres are acted upon by two distinct currents? If so, quote the language.

A. It does, in the preliminary paragraph setting forth his invention, and also in the specification of claim; and also where he speaks of the current induced by the action of the brush; and also where he says the "fibres are thrown on to it"—the cone.

X 143. Do you consider this language to negative the
731 idea that the fur fibres, as laid by the revolving brush, or discharged from it, are met by a current of air entering through the hole, n, induced partially by the rotation of the brush, and partially by the exhausted cone?

A. I do, and more especially after seeing the practical operation of such machines.

X 144. I understand you to say that you came to this conclusion from the reading of the patent?

A. Yes, and it was confirmed by the operation of the machines.

732 X 145. You have stated that the invention of Wells, as described in his reissued patent of Oct. 7, 1856, consisted in a process having two steps; please state what part of the patent defines the process, as consisting of two steps, and quote the language.

A. The preliminary paragraph, reciting the invention, the whole body of the patent, which gives a detailed account of a specific mode of working the process, and the specification of
733 claim.

X 146. Suppose, in a machine constructed like model 3, the jigging-roller was to be removed until after the bat was formed, and that after a bat had been formed by the action of the machine, the jigging-rollers were to be brought in contact with the bat, and that the bat was sufficiently hardened thereby on the sides to cause the fibres to be partially felted together, and that the tip of the bat was to be patted by hand till sufficiently hardened to admit

of removal; would the process be substantially the same as
734 that described in the reissued patent of Wells?

A. Not in my view of the invention set forth in the patent.

X 147. Why not?

A. Because, although you have supposed a bat of sufficient consistency, induced by hardening, to admit of taking it off, you have made no supposition that the bat is formed substantially in the manner set forth in the patent, but, on the contrary, have given me to understand that the bat was formed in a Fosket ma-
735 chine.

X 148. What element of the Wells process was wanted?

A. The first element, as I suppose would be obvious to anybody hearing my last answer.

X 149. What novelty or invention is there in hardening a bat by felting on a cone on which it had been deposited by the action of two currents, to wit, an impelling and an exhaust current, provided a bat had before been hardened by felting on a cone on which it had been deposited by the action of an exhaust current alone?

A. The same invention which is always found in the com-
736 bination of two old things, or in the combination of one old thing with a new one.

X 150. Would it not be self-evident to every one, that the first of the above mentioned processes was practicable, if the second had been previously known?

A. It would be evident after the patentee, Wells, had invented his method of deposition, and then the combination with it of the method of hardening on the cone.

X 151. In what respect does the first step of the Wells
737 process of the patent of Oct. 7 differ from the invention described in the patent of Sept. 30, 1856?

A. Not at all, in my view or opinion.

X 152. In your view, then, no process can be substantially the same as the process described in the Wells patent of Oct. 7, unless it involve as its first step the depositing of fibres upon a cone by the invention described in the Wells patent of Sept. 30, 1856.

A. That is my view, although it may be too narrow a one of the invention, for I know of no bat formed by deposition in any
738 way that had been hardened by felting on the cone on which it was deposited before Wells' invention.

X 153. What are the agencies by which the bat is hardened in the Wells process?

A. The special means of moisture, heat, pressure, and probably friction.

X 154. What produces the moisture and the heat?

A. The water. I don't know where it comes from, nor how it is heated.

X 155. What produces the pressure?

A. The cloths and the outer cone.

739 X 156. What produces the friction?

A. The water passing through the bat as it is immersed in and taken out of the kettle.

X 157. Suppose a bat deposited on a perforated cone, and covered with another perforated cone, and immersed in a thin solution of size, heated, which would circulate in like manner through the bat; would there not be heat, pressure, friction, and moisture?

A. Yes, except that it would be practically difficult, if
740 not impossible, to obtain pressure without serious disturbance of the bat with an outer cone alone, and no cloths.

X 158. Who was the first person, to your knowledge, who devised a mechanical means whereby bats deposited on the cone could be hardened by felting without the use of circulating currents of water?

A. I suppose you mean deposition in a fibrous state, and not winding; and the first I saw of such a process as a whole was at A. B. Taylor's shop in Newark. I don't know who it was that devised it.

741 X 159. In the machine upon which you tried the experiments which you spoke of in your examination in chief, and illustrated by drawings filed as exhibits, was there not a means of regulating the force of the impelled current?

A. I believe there was, on both the machines, by knocking off one pulley and putting on a larger or smaller one on the picker-shaft.

X 160. Was there not some other means of regulating the force of the impelled current?

A. Not that I know of; certainly none that was used;
742 there may have been one, and I not have observed it.

X 161. Were the machines used by you similar to Exhibit B?

A. Yes; they certainly had a trunk like that.

X 162. Are the proportions and relative distances of the parts shown in Exhibits J, K, L, correct representations of these parts of the machine?

A. I stated, when producing the exhibits, that they were not made upon a scale, but were fair and substantial representations of the experiments, which, of course, include proportions
743 and relative distances apart.

Direct resumed.

Q 163. During the experiments detailed in Exhibits J, K, L, or any of them, did you operate a valve in the opening of the rear part of the trunk below the brush, such as is represented in model Exhibit B?

A. No.

HENRY B. RENWICK.

Sworn to before me this 27th day of Oct., 1857.
R. E. STILWELL, *U. S. Commissioner.*

744 FRIDAY, *October* 30*th*, 1857.

Counsel for defendants not present.

Henry B. Renwick recalled on the part of complainants.

(Plaintiffs' counsel hereby consents that the testimony of the following witnesses shall be taken, subject to any objection which the defendants' counsel might properly make, if now present, and also subject to the right of the defendants' counsel to cross-
745 examine said witnesses, if he shall so elect to do.)

Q. 1. Will you state in what manner the fur was distributed along the length of the exhaust cone to make the bat of varying thickness from brim to tip, on the machines which you saw in operation at the establishment of Alva B. Taylor and others, in the city of Newark, in the State of New Jersey, as referred to in your former examination?

A. There were several machines at work in the shop, to some of which I paid more special attention than to others; and on
746 some of them, certainly, and I believe on all of them, an operator held in his hand a piece of paper, or card-board, which he applied so as to deflect the impelled sheet of fur, and thus make the desired inequality of thickness of bat along the length of the cone. The end of the machine at which the paper was held was that nearest the tip of the cone, so that the object was to make the bat thicker at or near the brim.

HENRY B. RENWICK.

747 *Hart Reynolds. Direct Examination, Wednesday, 28th October*, 1857.

Q. 1. What is your name, residence, and occupation?

A. My name is Hart Reynolds; aged 55; I reside in Union Village, Washington county, State of New York; I am a teamster.

Q. 2. Did you ever know Henry A. Wells? And if yea,
748 state when you first became acquainted with him, and where.

A. I did. I think that was his name. Harry Wells we used to call him. The first time that I recollect of becoming acquainted with him was, he came to Mr. Toby's in Grand street, in this city. I think it was the latter part of the year 1833, or the fore part of the year 1834. It was some time in the winter, to the best of my recollection.

Q. 3. What was he engaged in at that time?

A. I can't tell what his business was, any more than what I heard him say, that he was a hatter by trade.

749 Q. 4. Did you ever work with him on a machine of Thomas Blanchard's for making webs of fur for hat bodies?

A. I did.

Q. 5. During the time you so worked with him on said machine, did he suggest any improvement that he proposed to make? and if yea, state what such improvement was.

A. He did. The improvement was to use a cone instead of the endless wire cloth.

(Objected to as not competent.)

Q. 6. Have you any recollection how the fur web was
750 formed on the endless wire cloth in the Blanchard machine?

A. Yes, sir.

Q. 7. State how it was.

A. It was done by some exhaust-blowers that were fixed on the outside of the box.

Q. 8. How did the exhaust-blowers communicate with the endless wire cloth so as to produce the web of fur fibres?

751 A. There was an open space that led from the exhaust-fan that drawed the air from the centre of this endless cloth.

Q. 9. Examine model 8, and state whether it resembles or differs from the Blanchard machine you have referred to, and in what respects.

A. There were two fans instead of one, one on each side, and nearer the end, and there was a wire sieve in the box that came near to the endless wire cloth that ran from the card to the
752 wire cloth.

Q. 10. In what manner did Wells propose to apply the cone to which you have referred?

(Objected to.)

A. He was to use it instead of the endless wire cloth.

Q. 11. What part of the cone was to communicate with the exhaust-fans?

(Objected to.)

A. I don't know that I can tell you exactly what he said about that, or how it was to be applied; he was to attach it to his
753 exhaust-fan so as to use it in place of the wire cloth.

Q. 12. Did he say for what purpose he would substitute the cone for the wire cloth? and if yea, state what such purpose was.

(Objected to.)

A. Yes, sir, I think he did; it was to form hat bodies, as I understood.

Q. 13. At about what time was this suggestion made by
754 Wells?

(Objected to.)

A. I should think it was about the spring of 1834.

Q. 14. Have you any means of fixing how early it was in 1834?

(Objected to.)

A. I have.

Q. 15. State what are your means.

A. I left New York in the fore part of June, 1834, and it must have been before that.

755 Q. 16. Did he express any desire at the time he made this communication to you as to its being kept secret?

(Objected to.)

A. He did.

Q. 17. Did he give any reasons why he desired it to be kept secret?

(Objected to.)

A. I don't recollect whether he did or did not at the time.

Cross-examination by Mr. Harding.

756 X 18. State exactly what Wells stated to you.

A. I don't know that I could state exactly the words, but I can give you the substance of it. He stated that he didn't want us to say anything about it. We were then trying experiments, and he didn't want that we should say anything about it. That was the substance of it as far as I can recollect now.

X 19. What experiment were you trying?

A. We were throwing the fur from the card on to the wire cloth, the endless wire cloth like that shown in model 8.

757 X 20. What was the object of your experiments?

A. One object was to separate the hair from the fur; the other was to form it in such a way that it could be used into a hat body or used on a hat body, I could not say which. At any rate, it was to be used about hatting. I am not a hatter.

X 21. State precisely what experiments you tried.

A. We throwed the fur into this chamber from the card-
758 ing machine, (pointing to model 8,) and we let the air into the bottom by means of holes in the bottom of the box; that kept the fur up and let the hair drop; that was one experiment. The other was to form the batting for the hats; we went no further than that, to form the batting on the endless cloth, and let it drop off at the end of a machine into a box; that was all the experiments we tried, and I left.

X 22. Did he wish these experiments to be kept secret?

A. No, not these particular ones; it was the cone part he wanted kept secret. We had tried no experiments with it, but he
759 kept the doors locked while he tried those experiments; every one was not admitted.

X 23. How did he tell you that he proposed to form the batting into a hat body after it had left the endless cloth?

A. I don't recollect that he told what shape he proposed to put it in.

X 24. What did he propose to do with the batting that he formed?

A. I suppose it was to be put into hat bodies; but not be-
760 ing a hatter, I could not tell.

X 25. What did he do with the batting?

A. I do not know; it was not used there; I don't know anything about it; I was not by when any experiments were tried on it. I don't know whether there was any.

X 26. Did he never suggest to you anything about how he proposed to use that batting?

A. No more than I have explained to you. I think I have answered that question. I should think not. I don't recollect that he did. It was not likely, as I was not a hatter.

761 X 27. How long were you with him?

A. I did not work for him at all. I worked for Mr. Blanchard. The experiments were with the Blanchard machine.

X 28. Did he say that he intended to make any improvement on the Blanchard machine?

A. He did.

X 29. Did any one take part in these experiments besides yourself?

762 A. Yes, sir.

X 30. Who?

A. Mr. Wells, Mr. Hopkins, and Mr. Blanchard; all, more or less.

X 31. What did you do at Blanchard's factory at that time?

A. I operated the machine, and assisted about trying these experiments.

X 32. When did you next see Mr. Wells?

A. I could not tell you what year it was; it was some
763 time after.

X 33. Whereabouts did you see him?

A. I think it was in New York city.

X 34. Can you not be more definite as to the time and place you last saw him?

A. I could not now, sir.

X 35. Was it five years after you first saw him?

A. I should say it was more than that; but still I am not positive.

X 36. Was it ten years?

764 A. I could not tell you, sir.

X 37. From the time you left him to the present time, how have you been employed?

A. Most part of the time manufacturing cloth.

X 38. State precisely what Wells said to you at the time you were trying the experiments stated in your examination in chief, and all that he said to you.

(Objected to, as the witness has already answered this question in his cross-examination.)

A. I can't answer; any particular point that you want
765 to know I will answer, if I can.

X 39. State anything and everything which you now recollect that he stated to you, or can call to mind.

(Objected to by plaintiffs' counsel, the witness having already stated that he cannot. If the counsel will call his attention to any particular point, then he will answer, if he can remember.)

A. I can recollect about the improvements which he said he wanted to make on this machine; he would use the cone in-
766 stead of this endless cloth. I don't recollect of anything more about it, except that he wanted us to keep still about it, the same as I have answered before.

X 40. Can you not remember any other statement except that mentioned in your last answer?

A. There was conversation about letting in air and making this batting, and fixing up the machine and working at it.

X 41. Did he say he was going to make any other improvement on the Blanchard machine?

767 A. Nothing more than to use the cone.

X 42. What business did you go to after leaving Mr. Wells?

A. I worked a short time on a farm—about a month, as near as I can recollect.

X 42½. What did you do then?

A. I went into a factory to work at North Wosex.

X 43. How long were you there?

A. I could not tell exactly; I was there some few years.

768 X 44. Can't you fix the time?

A. I think I was there five years; it might not have been over four.

X 45. What did you do then?

A. I went into another establishment at North Whitecreek; I spun there, and done other work.

X 46. What did you do then?

A. I went back to North Wosex.

X 47. How long were you there?

A. I think between two and three years.

769 X 48. What year did you leave there?

A. I think in 1844. I am not positive.

X 49. What did you do then?

A. I hired a factory at Union Village, Washington county, N. Y., and manufactured cloth for farmers.

X 50. When did you leave there?

A. I left there in the spring. I could not tell what year without reckoning back. It must have been 1847, I think.

770 X 51. What did you do then?

A. I went to Galesville, and worked at manufacturing cloth. I was there five years.

X 52. What did you then?

A. I went to Salem.

X 53. What did you do there?

A. I worked for a man there.

X 54. What have you done since?

A. I was there two years.

X 55. What did you do then?

771 A. I used a team, and peddled some, and quitted my manufacturing business on account of my health.

X 56. What were you doing the next time you saw Wells after you left him in 1834?

A. I should think I was manufacturing.

X 57. Where?

A. I should think it must have been either at Union Village or Galesville; I am not positive.

X 58. After you left Wells, how long a time elapsed before you were asked, or had the subject of your conversation with

772 Wells recalled to you?

A. It was some years, I should think, to the best of my recollection.

X 59. Who recalled it to you?

A. I am not sure whether it was Wells or Hopkins. I am not sure it was either of them. It is my impression it was.

X 60. For what purpose, or with what view, was it recalled to you.

A. If it was Mr. Hopkins, he came to see me about being a witness in the case; and I think he was the first, I am not

773 positive.

X 61. How long ago was this?

A. The exact year I cannot tell.

X 62. Was it ten years after the conversation with Wells?

A. I should think it was.

X 63. Was it more than ten years?

A. I cannot tell you unless I had some dates to refer to.

X 64. What was said to you, at the time you have re-

774 ferred to, by Hopkins or Wells, or whoever it was, to recall it to your mind?

A. He asked me if I recollected the conversation about the cone at the time we were trying experiments, and I told him I did.

X 65. Can you state what was Mr. Wells' object in speaking to you as you say he did?

A. I can state what I supposed his object was.

X 66. Did he give you any reason for telling you it?

A. He said he wanted me to keep still, and not say any-

775 thing about it. He did not give me any reasons for telling about the cone; he mentioned it in common conversation.

X 67. Did he ever say anything to you about winding the batting on a cone?

A. No, sir, I don't know that he did, except that he said he was going to use the cone instead of the cloth of this exhaust-fan; in what way I don't know, as I did not stay there to see the experiment tried.

X 68. Did he never say anything to you about using any other cone?

776 A. Nothing but the one he speaks of, which I have described to you. He didn't speak of more than one that I know of.

X 69. Do you know whether another cone was not used in some way about the Blanchard machine?

A. I do not.

X 70. May he not have told you about some other cone on which the bat was to be wound after it was formed?

(Objected to, the same question in substance having been put, and the witness having testified that there was nothing said

777 about another cone, or winding on a cone.)

A. I think he did not. I don't recollect of his saying anything about any other cone.

X 71. What did Mr. Wells say to you when he saw you after you left him?

A. I couldn't tell you. He talked about his machine, and how he succeeded with it, and about many other things.

X 72. Have you ever had any connection with any Wells machine in any way since that time?

778 A. I have not.

HART REYNOLDS.

Sworn before me this 20th October, 1857.

R. E. STILWELL.

John Denyse. Direct Examination by Mr. Keller, Saturday, Oct. 24, 1856.

779 Q. 1. What is your name, age, residence, and occupation?

A. My name is John Denyse; aged 49 years; reside in Brooklyn, and prepare fur for hat bodies.

Q. 2. Did you ever know Henry A. Wells? If yea, when did you first become acquainted with him?

A. I did. I became acquainted with him some time in May, 1845.

Q. 3. Did you ever work for him; and if yea, when first and at what?

A. I worked for him some time in May, 1845, in making hat bodies.

780 Q. 4. By what means did you make hat bodies at that time?

A. By the machine he had invented for that purpose.

Q. 5. Did you see that machine when it was first started? and if yea, state when it was.

A. I did. I can't tell exactly the date; it was some time in May, 1845.

Q. 6. Look at model Exhibit E, and state whether it is like or different from that machine.

781 A. It is a perfect model, with the exception of a difference in the gear of one of the belts.

Q. 7. State which of the belts, and how it differed from model Exhibit E.

A. The brush was driven from a shaft at the feeding end of the frame.

Q. 8. Is there any circumstance that enables you to remember that difference in gearing?

A. The shaft that drove the brush was the one I broke my arm on.

782 Q. 9. Were you present the first time that machine was tried for making hat bodies?

A. I was.

Q. 10. State the result of that first trial.

A. It formed a good body.

Q. 11. What was done with the body after it was formed?

A. Under Mr. Wells' direction, I put it in hot water, on the cone.

Q. 12. Was anything done with it before it was put in hot water; and if so, what?

783 A. There was a woollen cloth put over it, and a metallic cover over that.

Q. 13. Do you know if anything was done to it after it was taken out of the hot water; and if so, what?

A. The cover was taken off, and the cloth and the body taken from the cone, and Mr. Wells hardened it.

Q. 14. How long did you work with Wells after that?

A. I worked there until he went away. I staid there till 1849.

784 Q. 15. Were other machines constructed on that plan?

A. There was three or four, I believe.

Q. 16. How long after the first one was started before these others were made?

A. I can't tell exactly. The first one was wood, and couldn't stand the racket; he went right to work and made iron ones.

Q. 17. About how many hat bodies per day did each machine make?

785 A. The first iron machine made a hat body every four minutes, and carried them off, and dipped them. The general average was one hundred and fifty to three hundred, according to the different kinds of stuff.

Q. 18. Do you remember how many machines were in operation in the establishment when you left in 1849?

A. I think there was six.

JOHN DENYSE.

Sworn before me this 24th Oct., 1857.

R. E. STILWELL,
U. S. Com.

786 *Cross-examination by Mr. Harding, Wednesday, 28th Oct., 1857.*

X 19. How long was the machine like Exhibit E run?

A. I can't tell exactly how long it was run. Others were introduced.

X 20. What do you mean by others?

A. I mean that there was another way of making hat bodies. The machines were altered and improvements made on them.

X 21. What was the change made in the machines?

787 A. They done away with the hood. There was a new form—a nose-piece made. By nose-piece I mean mouth of the trunk.

X 22. What was the effect of this improvement?

A. The hat body was made more regular and faster.

X 23. In what respects was it made more regular?

A. There were not so many knock-downs—made more sure.

X 24. What do you mean by knock-downs?

A. I mean they would not pass; they would have to be made over again; they were not good.

788 X 25. In what respects were they defective?

A. The fur not laid on the cone properly.

X 26. How?

A. They could not regulate the body in thickness from the bottom to the tip so well.

X 27. Who was it that determined what should pass, and what should not?

A. The hatter who hardened the hats.

X 28. How did he determine it?

789 A. By holding them up to the light, and looking inside?

X 29. What would he see then?

A. He would see some flaw in them, and see some spot that would be too thin.

X 30. What would he do then?

A. He would show them to the foreman.

X 31. What would he do with the bats?

A. If they could not be made good by hand, they would dry them, and do them over again.

790 X 32. Would not there be a good deal of trouble in separating the furs after they had been immersed in hot water and dried again?

A. There was no separation; they were only dried and tore apart, and fed on the machine again.

X 33. Was not the fur felted together?

A. Very little; nothing so as to hurt it.

X 34. Did it come to pieces readily?

A. Yes.

X 35. You say that if they could not be made good by
791 hand, they would put them in the machine and make them over again. How was it, that defective bodies were made good by hand?

A. If there was a thin place in it, they would put a little fur on it by hand—called stopping off.

X 36. What change did the improvements make in this matter?

A. They simplified the working of the machine.

X 37. What was the reason that the machines used by you before the improvements were added caused the defects in
792 the bat?

A. They were not regular; they did not do half as much work; they made mistakes, the same as knock-downs; there was no dependence on them.

X 38. What part of the machine caused these defects?

A. Several parts; the aprons—the way they were situated on the old machines—were all the time out of order; they would not run; the suction-fan was all the time out of order, too.

X 39. What were the other defects?

793 A. The brush was made larger after, in the improvement. There appeared to be much gearing about it; I don't know of any other defects in particular.

X 40. Was there any complaint or difficulty about the bats made on the first machine?

A. Nothing only what I heard said around the shop—the foreman and Mr. Burr.

X 41. What did they say?

794 A. Mr. Burr said he was going to have them altered; the customers appeared to find fault because they were not made very good.

X 42. Had you not tried to work them up to make them look as well as they could before you sent out the bats to customers?

A. I did not work at the bodies myself; those that handled them did try their best, I suppose.

X 43. How long were you working with these machines before the improvements were added?

795 A. About eleven months, I think, from the first to the time the improvements were first made, before the time the improvements were introduced.

X 44. Were the improvements to make the machine like Exhibit B?

A. That is the improved machine.

X 45. Did they always use machines like Exhibit B, after it was introduced?

A. I think so; I don't see any difference between the machines they use and Exhibit B.

X 46. How many machines like Exhibit E were used be-
796 fore the improved machine, like Exhibit B, was introduced?

A. I think there was four.

X 47. What became of those machines?

A. They were altered and made like the new one.

X 48. How long after a year from the time you commenced work for Wells was it that they gave up the use of the old machines?

A. I think the first improved machines were started in
797 April, 1846, and they altered the others as fast as they could, and they kept the old ones running until they altered them.

X 48½. How long?

A. I should think it was five or six months before they got them all altered.

X 49. From that time to the present, did they use any machines like Exhibit E?

A. No, sir; I have never seen one.

X 50. Have you worked for Mr. Burr since the time
798 spoken of by you?

A. Not steady; I have been away twice; I am working for him now. I went away to California, in March, 1849, and was away about two years and six months from Mr. Burr.

X 51. Did Mr. Burr make these improvements?

A. He was the first one I heard speak about it; he and Mr. Taylor had a machine made.

X 52. What was the effect of these improvements on the business which you did for the hatters?

799 A. Work was done much faster, and appeared to give much greater satisfaction; and business increased very fast.

X 53. Was the business a very profitable one before the improvements?

A. I cannot say; I don't know anything about the profits.

X 54. Were any hat bodies returned before the improvements were introduced?

A. I believe there was.

X 55. For what reason?

800 A. Sometimes they were not laid good; sometimes they were not on the proper sized cone.

X 56. Did any customers stop sending you work?

A. I don't recollect but one, and I don't know that he stopped altogether or not.

X 57. Why do you think he stopped?

A. I know he had some little difficulty with Mr. Burr. He said it wasn't the same kind of stock he had sent him.

X 58. Who was the largest customer that you had?

801 A. Before I went away I think Mr. Shipman was the principal customer.

X 59. How many hat bats were made for Burr and St. John, the owners of the patent?

A. I cannot tell exactly; there wasn't a great many; they were small customers at that time; they were in trade at the time.

X 60. How was the distribution of the fur on the cone

802 so as to make the brim thicker than the tip, effected on the old machine?

A. It was done by the use of the hood, hanging down over the mouth of the trunk so as to force the greatest body to the bottom, raised up gradually so as to form the tip very light.

X 61. What part of the cone did the fur strike on?

A. The bottom first, and a little ways up from the bottom.

X 62. Did it strike against the cone right opposite to the mouth of the trunk?

803 A. Yes, sir, it covered a space as wide as the mouth-piece of the trunk.

X 63. What was the advantage of the new mouth-piece like that on Exhibit B, over the old one?

A. They set the shape of the mouth-piece as they wanted to form the bat; they could not do that on the old.

X 64. What was the advantage of that?

A. It would form a more perfect bat with less trouble.

X 65. Did you have to use a hood with the old machines?

A. Yes.

804 X 66. Why?

A. It would have the body all of the same thickness, if we didn't.

X 67. Who worked the hood on the old machine—the cone tender?

A. Yes.

X 68. Do you require the same number of men with the new machine as you do with the old?

A. Yes.

805 X 69. How do the number of knock-downs on the new machines compare with the number of knock-downs or defective bodies on the old machine?

A. There are nothing like as many—not one to ten, nor one to twenty, I think.

X 70. Would you suppose one to thirty?

A. I can't say; there might be.

X 71. How does the number of bodies made with the
806 improved machine compare with the number made by the old?

A. I should think there was double the quantity made on the new machines, easy.

X 72. When you first started the old machine, were not you occupied much in experiments?

A. It was on the wooden machine until we got the first iron one, when we got on regular.

X 73. Were not you occupied during this time a good many days, in which you only made a very few good hat bodies on the wooden machine?

807 A. Yes, on the wooden machine.

X 74. Did you ever see a merchantable hat body which was not thicker at the brim than at the tip?

A. No.

X 75. Was there any opening in the old machine into the trunk under the brush?

A. Yes, sir.

X 76. What did that do?

A. It was to makea draught to make the fur fly to the cone.

808 X 77. What made the draught?

A. The brush.

X 78. Did the cone make a draught through the trunk?

(Objected to, witness not being called as an expert.)

A. The cone had a suction under it, which helped a little I suppose.

X 79. What number of bodies do you make per day on the improved machine?

A. When we first started them, the napping bodies we made 180, and the coarser stock 300.

809 X 80. What do you mean by napping bodies?

A. Bodies made out of fine stock and napped afterwards.

X 81. They are napped after the body is completed and felted?

A. The nap is put on separate at the kettle after they are felted.

X. 82. What is the difference between a napping body and a common body?

(Objected to, as the witness is not produced as a hatter,
810 and has not testified as a hatter.)

A. I am no hatter, and don't profess to know.

X 83. Do you know? and if you do, state it.

A. The one, the napping body, is formed very light, and very particular, and very large; the common hats are formed out of much commoner stock, and much heavier.

X 84. Do you know what the effect of closing up the opening under the brush in the old machine would be?

A. It would allow the fur to fall too much to the bottom of the cone; it wouldn't make a good tip.

811 *Re-direct by Mr. Keller.*

Q. 85. Before the improved machine was put up, what was about the number of knock-downs in a hundred bodies made, to which you can testify from your own knowledge?

A. I cannot tell exactly, as I never hardened them; there was a good many.

Q. 86. What do you mean by a good many?

A. Fifteen out of a hundred.

Q. 87. What occasioned the knock-downs—the defects in
812 the machine, or the want of skill in the cone tender?

(Objected to because the question has been answered by the witness in 37th and 38th answers, witness having attributed these defects to the machine and its different parts.)

A. It appeared to be in the machine, as far as I could see.

Q. 88. What part of the machine?

(Objected to on same grounds as before.)

A. It would be the draught as much as anything; every now and then we would have to alter it.

813 Q. 89. What were your duties in the establishment which would enable you to judge of the number of knock-downs, and what occasioned them?

A. My duty was to carry them off from the machine and dip them in hot water in the first place; the occasion of the machine making bad bats was, the fan belt would slip, and there would not be suction enough to keep the bat in its form on the cone where it ought to lay. I had to put it on and tighten it up when it got
814 slack.

Q. 90. Was the power of the engine uniform, during the time the machines were working with the hood?

A. During the first part of it it was, until they got too many on.

Q. 91. What was the difficulty then?

A. She hadn't power to drive all the machines which were on steady.

Q. 92. You have stated on your cross-examination that the fur was not laid on the cone properly with the old machines
815 before the improvements were added, and that they could not regulate the body in thickness from the bottom to the tip so well; why was this?

(Objected to for the same reason as before.)

A. It was owing to the mouth-piece. They could regulate the fur on the new machine by the mouth-piece; I mean the trunk or conductor which conducts the fur to the cone.

Q. 93. What was the difficulty in regulating the thickness of the bat with the hood or bonnet?

816 A. The great difficulty appeared to be with the one that handled it, if the machine run regular.

Q, 94. Who were the persons generally employed to operate the hood or bonnet—the ordinary hands or hatters?

A. They had hatters first off, and some others were employed after they got other machines up.

Q. 95. Did it require experience and skill in working it to make a good hat?

A. It wanted practice and judgment.

817 Q. 96. Did it require such practice and judgment on the improved machine like Exhibit B, when the mouth-piece was once set to a particular kind of hat body?

A. No, it was much easier.

Q. 97. Generally speaking, were the hat bodies, made on the machines before the improvements were added, of a fine or coarse quality?

A. The first that we used to make was more fine stock than coarse.

818 Q. 98. Does it ever occur now that hat bodies are thin in spots, requiring to be stopped off?

A. Yes, sir.

Q. 99. Do you know of your own knowledge that customers found fault with hat bodies made on the old machines with a hood?

A. I don't know of my own knowledge that they found fault with the making of them, but with the weight of them.

819 Q. 100. In answer to question 42, you stated that those who handled the bodies tried "their best to make them look well, I suppose:" did you so testify from your own knowledge, or from supposition?

A. I saw them working at them, and when they found the least flaw in them, they showed them to the foreman, to see whether he would let them pass, or make knock-downs of them.

Q. 101. Did or did not the same thing occur after the improved machines were substituted?

A. Yes, sir.

820 Q. 102. You have stated that there were four machines like Exhibit E, used before the improved machine like Exhibit B was introduced; did you include or exclude in that number the first experimental wooden machine?

A. I excluded that.

Q. 103. You have stated that some hat bodies were returned before the improvements were introduced; do you know if any have been returned since the improvements have been introduced?

A. Yes, there have been some returned.

821 Q. 104. Do you know, since the improved machines were introduced, whether the speed at which the machines are run has been increased?

A. In the first place it was decreased when the new machines were introduced, but has been increased lately.

Q. 105. When the improved machines were first started, were they run at greater or less speed than the old machines?

822 (Objected to.)

A. I think it was a little; the size of the brush was increased.

Q. 106. In the present machines when the exhaust fan happens to stop in the formation of a bat, what is the consequence?

A. It can't stop, unless the machine stops, or unless it breaks.

Q. 107. What would be the consequence if the fan should

823 stop?

A. It would spoil the hat body on the cone.

Q. 108. What would you call that body so spoiled?

A. I wouldn't call it a body—only fur.

Q. 109. What do you mean in your testimony by the expression knock-downs?

(Objected to, witness having defined in his 24th answer.)

A. A bad body, not fit to send away to the owner.

Q. 110. On your direct examination, when asked in the 17th question, about how many hat bodies per day did each ma-

824 chine make, you have testified, "the first iron machine made a hat body every four minutes; I carried them off and dipped them; the general average was 150 to 300, according to the different kinds of stuff;" and on your cross-examination, when asked, question 51, how many hat bodies made with the improved machine compare with the number made with the old, you answered, "I should think there was double the quantity made on the new machines, easy;" and when asked, question 79, what number of bodies do you make per day on the improved

825 machine, you answered, "When we first started them, the napping bodies, we made 180, and the coarser stock 300;" will you explain these several answers?

A. The first iron machine we started I said we run one every four minutes; the next question I referred to the present arrangement—that is, what we can do now; and the question referring to the 180 bats I have reference to first starting of the improved machine.

826 Q. 111. What is the shortest space of time in which you have seen a hat body formed in the machines in the present establishment?

A. I can't say, as I am not in the forming part at present, and have not been since this establishment has been built.

JOHN DENYSE.

Sworn before me this 20th October, 1857.

R. E. STILWELL.

Direct.—William Byfield, examined by Mr. Keller, Saturday, 24th Oct., 1857.

827 Miles B. Andrews appears for the defendants, by the request of Mr. Gifford, one of the defendants' counsel, and objects to the proceeding with the examination by plaintiffs of their witnesses in chief this day, Saturday, unless the said plaintiffs will reserve their witnesses for cross-examination on Monday morning, the 26th inst., or give the defendants some other opportunity to cross-examine said witnesses, and states that Mr. Harding, one of the defendants' counsel, has been suddenly called home to Philadelphia on account of the death of a relative, and that pre-
828 viously to his leaving for home had made arrangements with Mr. Gifford, the other counsel for the defendants, to attend this examination to-day, on the part of the defendants, and that Mr. Gifford expected and intended to have done so, but that last evening he (said Gifford) was taken suddenly and violently ill, and is now confined to his bed, and unable to attend this examination to-day, and that the illness of said Gifford was unknown to Mr. Harding when he left. Mr. Andrews further states that said defendants' counsel have no objection to the plaintiffs now
829 proceeding with the examination of their witnesses in chief if the defendants can have an opportunity to cross-examine them.

Plaintiffs' counsel states that last night the examination was adjourned in the presence of defendants' counsel to the hour of 10 o'clock. Mr. Andrews, now present, is the associate of Mr. Gifford, has taken part in the examination of some of the witnesses, and is, therefore, sufficiently familiar with the case to attend to the
830 cross-examination of the witnesses to be produced on the part of the plaintiffs, and particularly to the present witness, who is simply called as to matters of fact. Plaintiffs' counsel consents to produce the present witness at some future time for cross-examination, but at the expense and risk of the defendants. The short limit of time now left for the closing of the proofs on the part of plaintiffs constrains the plaintiffs' counsel to proceed with the examination of his witnesses at this time. Should any witnesses be called to-day to give testimony, plaintiffs' counsel now
831 agrees, that should the examination in chief be concluded to-day, such witnesses shall be produced for cross-examination on Monday.

Mr. Andrews replies that he is not attorney or counsel in the case, and does not feel himself competent to examine the witnesses herein; that the only part he has taken in the examination of any of the witnesses in this case is simply to put questions to one of them, previously written out by the counsel for the defendants during his absence for a short time.

Q. 1. What is your name, age, residence, and occupation?

832 A. My name is William Byfield; aged thirty-four years; residing at Danbury, Conn., and my occupation at present is that of forming hat bodies.

Q. 2. What has been your profession, and what length of time have you been engaged in said profession?

A. Hatter; eighteen years.

Q. 3. In what establishment are you engaged, and in what capacity?

A. For Tweedy, White & Co., in Danbury; I have charge
833 of the forming department.

Q. 4. By what means are hat bodies formed in that establishment?

A. By the process of the Henry Wells patent.

Q. 5. Did you ever know Henry Wells; and if so, when first?

A. Yes; I knew him first in 1845.

Q. 6. Did you ever work for him in making hat bodies; and if so, when first, and where?

834 A. I have; it was in the latter part of May or the beginning of June, 1845, in Hague street, in this city.

Q. 7. What was Wells engaged in at the time you went to work for him, as stated in your last answer?

A. Introducing his forming machines for forming hat bodies.

Q. 8. Did you work for him on the said machine?

A. I did.

Q. 9. What kind of bodies were made on that machine—fur or wool?

835 A. Of fur.

Q. 10. When did you first see the machine in operation?

A. It was some days before I went to work on it; I can't tell now.

Q. 11. How were the bodies made on that machine, as to the thickness from brim to tip?

A. They were made much heavier at the brim and band than at the tip.

Q. 12. By what means was this varying thickness obtained on this machine?

836 A. By the use of a hood.

Q. 13. How was this hood operated?

A. By hand.

Q. 14. In the working of that machine who operated the hood?

A. The workman called the coner. The first ones who worked on that machine were myself and a man of the name of Martineaut.

Q. 15. Was the working of this machine successful or unsuccessful for making hat bodies?

837 A. It was successful.

Q. 16. From the time you first went to work in the es-

tablishment what was done with the hat bodies made on that machine?

A. They were dipped in hot water and hardened.

Q. 17. After they were hardened what became of them?

A. I suppose they were made into hats.

Q. 18. Do you know for whom such bodies were made?

A. The first bodies we formed were said to be for a man
838 of the name of Taylor.

Q. 19. What was Mr. Taylor's business?

A. The manufacture and sale of hats.

Q. 20. How long were you employed in connection with that machine?

A. As near as I can recollect it was between eight and nine months.

Q. 21. State to what extent the said machine or machines were used during the time you were there.

A. When I first went to work there there was one ma-
839 chine. When I left there were five.

Q. 22. About what number of hat bodies could each machine make per day?

A. We used to form at that time from one hundred and eighty to three hundred a day, according to the weight and quality; the quality would regulate the size of the hat.

Q. 23. Will you examine model Exhibit E, and state whether it is like or different from the machines you have worked on for the said Wells at the time referred to in your testimony?

840 A. It is substantially the same, but it is a little different in construction.

Q. 24. How are the hat bodies hardened in the establishment of Tweedy & White, in Danbury?

A. By hand labor.

Q. 25. What is done with the hat bodies to harden them before they are removed from the cone?

A. They are covered by a cloth and metallic cover, and soaked through in hot water.

Q. 26. How does the mode of hardening practised at
841 Tweedy & White's resemble or differ from the mode of hardening practised by Wells when you worked for him, as before testified?

A. There is no difference.

Q. 27. Have you ever had hat bodies, after being removed from the cone, and without any further hardening at that time, lay over until they got dry, and then further hardened? and if yea, state what was their condition before further hardening.

A. I have. They would be soft, but not as soft as the
842 blown fur.

Q. 28. Was there any, and if yea, what difficulty was there found in hardening in that state?

A. They are rather more apt to strain than when wet, although they will make equally as good a body in hardening.

Q. 29. In working on the wells machine at the time you said you worked for him, on what part of the length of the cone was the fur deposited in the commencement of the operation?

843 A. Usually about one-third.

Q. 30. At which end?

A. At the bottom, or brim.

Q. 31. How was that effected?

A. By letting the hood remain stationary down.

Q. 32. What was then done in continuing the operation?

A. We regulated the weight at the tip and crown by the hood or bonnet.

WILLIAM BYFIELD.

Sworn to before me, this 24th September, 1857.

844 RICHARD E. STILWELL,
U. S. Com.

UNITED STATES OF AMERICA,
Southern District of New York, City, County, and State of New York, ss.

Be it remembered, that on this 30th day of October, in the year of our Lord one thousand eight hundred and fifty-seven, I, R. E. Stilwell, a commissioner duly appointed by the circuit court of the United States for the southern district of New York, in

845 the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did

846 call and cause to be and personally appear before me, at my office, in the city of New York, in the said southern district of New York, in the State aforesaid, Stephen H. Smith, to testify and the truth to say, on the part and behalf of the complainants, in a certain suit or matter of controversy, now depending and undetermined, in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowper-

847 thwaite and Alva B. Taylor are defendants.

And the said Stephen H. Smith being about the age of twenty-nine years, and having been by me first cautioned and sworn

to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said Stephen H. Smith, and he did thereupon depose, testify and say as follows, namely:

Q. 1. State your name, age, residence, and occupation.

A. My name is Stephen H. Smith; aged twenty-nine years; reside in Brooklyn, and am a merchant.

848 Q. 2. Have you ever been a practical hatter? and if yea, where did you learn your trade, and how long did you work at it?

A. I have. I learned my trade in Connecticut, and worked at it about five years.

Q. 3. Have you in your possession, and can you produce as exhibits, some hat bodies formed by you on machines at the
849 plaintiffs' establishment?

A. I have in my possession some hat bodies which I assisted in forming, which I hand to the commissioner, and they are marked Exhibits T and Q.

Q. 4. What does Exhibit T represent?

A. A hat that was formed in the usual way and manner was removed from the cone, and taken with the water in it, and dried without wringing out the water. It was then dried thoroughly, after which I hardened it by the old process.

Q. 5. Was anything done with it after it was formed on
850 the cone, and before it was taken off from the cone? and if so, what?

A. Cloths were wrapped around it, and the outer cap placed upon it and dipped in a tub of hot water.

Q. 6. What do you mean by the expression, "I hardened it by the old process," in your answer to the 4th question?

A. I mean that it was hardened in the same manner that we formerly hardened hat bodies made by hand.

Q. 7. What does Exhibit Q represent?

A. It represents the same as Exhibit T, with the exception that the water was wrung out of it after it was slipped from the
851 cone.

Q. 8. Was Exhibit Q hardened in any way after it was removed from the cone?

A. It was not.

Q. 9. You have stated that the water was wrung out of it; does that differ from the usual practice at the plaintiffs' establishment in the manufacture of hat bodies?

A. It does not. It was done in the usual manner.

STEPHEN H. SMITH.

Sworn to before me this 30th October, 1857.

852 R. E. STILWELL,
U. S. Com.

Direct Examination of Nelson Wilcox, by Charles M. Keller, Thursday, 29th Oct., 1857.

Q. 1. What is your name, age, residence, and occupation?

A. My name is Nelson Wilcox; age forty-five years; reside in Norwalk, Conn., and am a hatter.

Q. 2. In whose establishment do you work at present?

853 A. In the establishment of H. A. Burr & Co.

Q. 3. Have you some hat bodies made on the machines in the establishment of H. A. Burr and others, plaintiffs in this suit? and if yea, will you produce them?

A. I have, and produce such hat bodies. They are marked Exhibit W.

Q. 4. When were they made?

A. They were formed within a few weeks.

Q. 5. How do they correspond in quality and texture

854 with the hat bodies usually manufactured in that establishment?

A. They are about the general run.

NELSON WILCOX.

Sworn before me this 29th October, 1857.

R. E. STILWELL, *U. S. Com.*

Direct Examination of Israel D. Condit, by Chas. M. Keller, Thursday, 29th Oct., 1857.

Q. 1. What is your name, age, residence, and occupa-

855 tion?

A. My name is Israel D. Condit; aged 54 years; reside in Millburn, Essex county, New Jersey, and am engaged in the manufacture of hat bodies, fur, and wool.

Q. 2. State how long you have been engaged in the manufacture of hat bodies, of the kind of hat bodies, and the whole extent of your experience in such manufacture.

A. I commenced the business of manufacturing wool hat bodies in the year 1829. I commenced in the manufacture of fur

856 hat bodies in the year 1836, and have been engaged in the same business to the present time.

Q. 3. By what plan did you manufacture wool hat bodies?

A. We used the Grant & Townsend patent machinery.

Q. 4. On what plan did you first manufacture fur hat bodies?

A. We used the Blanchard machine.

Q. 5. How were fur hat bodies made in working the Blanchard machine?

857 A. This model Exhibit 8 represents the general mode of operating, but not substantially the Blanchard machine; the fur was fed upon the feed-apron, which passed to a small carding machine, about half the size or dimensions of a common carding machine; the fur was delivered from the doffer, by the means

of a quick fancy card. into the chamber, and deposited upon the endless web of wire cloth, by the means of an exhausting fan, when the web or bat so formed was passed between two rollers,
858 which were put in motion by an eccentric, whereby the web or bat was hardened to a tenacity sufficient to be taken from the machine, and passed to another machine, which was called a forming machine, where the body was formed in a manner similar to the wool-body machine, by winding.

Q. 6. What was the effect on the hat body when made by winding a web of fur fibres previously hardened as you have stated in your last answer?

A. One of the effects of winding the hardened web was uniting
859 the different layers of web together, forming a compact body as we now do by forming the whole body by one operation.

Q. 7. Did you experience any, and if so, what difficulty, in uniting these several layers in the after operation of hardening and felting the body?

A. The difficulty experienced was, as I stated in my previous answer, uniting the many layers of fur together, which generally numbered about twenty-two layers to form the thickness required to make a hat body; they would often separate, after undergoing
860 the operation of the hardening process. In the felting process we experienced a great difficulty by the fibres of the fur being laid nearly all in one direction, causing the body when sized to be more elastic and stretchy in one direction than the other.

Q. 8. In the usual process of sizing by felting, after the body has been hardened, are the inner surfaces of the hat body in contact; and if yea, do they felt together so as to interlock?

A. In the process of sizing, the inner surfaces are brought together, but do not interlock.

861 Q. 9. Are those surfaces brought together in the usual process of hardening by hand? and if not, state how they are prevented from coming together, and for what purpose.

A. In the process of hardening hat bodies by hand, a layer of paper or cloth is placed inside, to prevent the two surfaces from coming in contact.

Q. 10. What is the paper or cloth so used termed by hatters?

A. An inlayer.

Q. 11. You have stated that in the Blanchard machine a
862 quick fancy was employed to take the fur from the doffer of the card and discharge it into the chamber; do you know if at any time any other instrument was used for that purpose? and if yea, state what such other instrument was.

A. In the first experiments with the Blanchard machine a fan was used.

Q. 12. How did that answer the purpose?

A. It did not answer the purpose in discharging the fur from the card, and consequently the fancy was adopted in its place.

863 Q. 13. Did you at any time, and if so, when, acquire an interest in the said Blanchard machine; and if so, at what expense?

A. In the fall of 1836, I purchased a half or a third of the Blanchard improvements, for which I paid $20,000; that is what I paid for the improvement; I do not intend to include in this amount the sum expended in putting the machine into operation.

Q. 14. What amount, about, was expended in addition

864 to the price paid for the invention specified in your last answer?

A. I could not state exactly the amount, but at least $50,000 were so expended.

Q. 15. What were the views in general about this time of hat manufacturers as to the introduction of machinery for forming fur hat bodies, in favor of or adverse thereto?

A. Manufacturers in our vicinity were very anxious to have the machine succeed.

Q. 16. How long did you continue to work on the Blan-

865 chard plan for making fur hat bodies?

A. We used the Blanchard machine until Wells made his improvements.

Q. 17. When did you first hear of the Wells invention for forming hat bodies?

A. In the early part of the year 1845.

Q. 18. When did you first get accurate information of the construction and operation and mode of procedure invented by Wells?

A. About the time already mentioned.

866 Q. 19. Prior to obtaining such accurate information, did you make any experiments with a view to form hat bodies of fur fibres on a perforated cone; and if yea, by what means, and what was the result of such experiments?

A. I did experiment with a cone, by placing it in the air chamber similar to the Blanchard machine, which was attached to a carding machine, and after trying many experiments, failed to make a perfect hat body.

Q. 20. What were the difficulties you experienced in these experiments?

867 A. We found the difficulty to be in regulating the quantity of fur to be distributed on different portions of the body required to produce a perfect hat body.

Q. 21. By what means in the said experiments did you hold the fur to the surface of the cone?

A. By exhausting the air through the cone by a fan placed underneath.

Q. 22. After you obtained accurate information of Wells' plan, did you adopt it?

A. Yes.

868 Q. 23. What was the result of your trials of that plan?

A. The result was, we soon made a perfect hat body.

Q. 24. How was the machine you then adopted constructed, and how did it operate?

A. That model (pointing to Exhibit E) represents substantially the machine, excepting the hood.

Q. 25. How did you regulate the thickness of the bat from brim to tip?

869 A. The operator held in his hand a pasteboard, by which means he directed the fur to make the required thickness in the brim.

Q. 26. Where did the operator use such pasteboard in the working of that machine?

A. He used it at the mouth of the trunk, to direct the current of fur as it passed from the trunk to the cone, in regulated quantities as required, to make a hat body thicker or thinner, as required.

870 Q. 27. Did he apply it at the top, bottom, or sides of the mouth of the trunk?

A. When the operator commenced forming a body, he would let the cone first be entirely covered from bottom to top, and afterwards direct the fur with his board to such parts of the cone as required more or less. In doing so, he would hold his board at the top of the trunk.

Q. 28. How many such machines did you have?

A. I had two of that kind.

Q. 29. Did you use them simply for experiment, or for the business of manufacturing hat bodies?

871 A. I used them for the business of manufacturing hat bodies.

Q. 30. How long did you so use them and operate them in the manner you have described?

A. I don't recollect the length of time that we used that machine, but used it until we adopted the trunk now in use.

Q. 31. Can you state about how long it was before you altered the machines to the present form?

A. I can't state accurately, but merely from memory. It was some time after Mr. Wells obtained his patent.

872 Q. 32. Before the alteration referred to, about how many hat bodies per day could you make on one machine?

A. We made about two hundred and upwards a day.

Q. 33. How did the hat bodies so made compare with the hat bodies made on the machine as now used, as far as regards their structure?

X. The hat body now made is perfect without relying upon the skill of the operator, as the machine now used when set by the foreman, and tended by any common hand, always produc-
873 cing uniform work; whereas the machine which required the use of the board required a skilful operator.

Q. 34. When the machine was operated by a skilful operator to direct with a pasteboard the distribution of the fibres, how did the quality and structure of the hat bodies compare with the hat bodies now made on the machine?

A. They were generally good, but not as uniformly perfect as the bodies made with the improved machine.

Q. 35. When the machines were altered, as you have stated, how did they correspond with the model Exhibit B?

A. Substantially like model B.

874 Q. 36. At the time you adopted the Wells machine what mode did you adopt for hardening the hat bodies?

A. When the body was formed we covered it with flannel, or other woolen cloth, and then placed another cover of tin over that, and then immersed it in hot water.

Q. 37. What effect did that have on the bat of fur fibres?

A. It had the effect to interlock the fibres, and by the action of the hot water passing through, produced friction sufficient
875 to produce felting, sufficient to harden the body so that it could be taken from the cone.

Q. 38. Have you ever examined a hat body so hardened, and which had not been otherwise hardened, to ascertain its condition, after being thoroughly dried? and if yea, state what you found to be its condition.

A. I have frequently examined hat bodies in that state, and found them hardened sufficiently to be handled preparatory to the hand-hardening, which is always required in finishing the hat body.

Q. 39. Have you ever tried to form hat bats on an ex-
876 hausted cone, in connection with a card, when a fan was used to discharge the fur fibres from the doffer of the card? and if yea, state what was the result of such trials.

A. We never tried the fan in that connection.

Q. 40. Have you ever tried to make wool hat bodies on an exhausted perforated cone?

A. Yes.

Q. 41. What was the result of such trial?

A. We have tried the working of wool upon the cone in
877 various ways, from an entire wool body, with various mixtures, wool forming some part, and have always found it to be an entire failure.

Q. 42. To what did you attribute such failure?

A. To the fact that the staple of wool in manufacturing requires

to be held in some manner similar to the process of carding, while in the process of manufacturing. When put through the fur-forming machine it would stand all endwise, so that the particles of wool fibres would all stand endwise, making it impos-
878 sible to form a hat body that can be used.

Q. 43. Examine defendants' machine here present, and state whether you have ever, and if so when, and where, seen machines in operation for forming hat bodies resembling it?

A. I saw machines at work in Newark, like the one exhibited here. I can't state the time with certainty—a year or more ago.

Q. 44. In whose establishment?

A. In Mr. A. B. Taylor's.

879 Q. 45. When you saw such machine in operation, in what manner was the fur distributed in the direction of the length of the cone, to determine the varying thickness of the bat from brim to tip?

A. By feeding the fur upon the feed-apron in regulated quantities, thereby depositing, by the use of the pickers, upon the cone such quantities as is required in the tip and brim to make a hat body.

Q. 46. Did you see hat-forming machines in that establishment more than once?

880 A. I think I saw them twice.

Q. 47. Was the mode of regulating the deposit of the fur upon the length of the cone the same every time you saw those machines in operation?

A. I think they were not.

Q. 48. What other mode did you see?

A. I think once I saw something like a cover, so arranged
881 as to distribute the fur upon the cone.

Q. 49. Did such cover vary the distribution along the length of the cone?

A. I think it did.

Q. 50. Have you ever known sizing, or a solution of glue, to be used in hot water, in the process of hardening hat bodies?

A. I have never known or heard of its being used.

Q. 51. Have you known such solution to be used in any
882 stage, and if so, what stage, in the manufacture of hats?

A. I have never known glue to be used in the manufacture of hats, except for the purpose of stiffening them, which was confined to wool hats alone.

Q. 52. What would be the effect of dipping fur bats in a solution of shellac, before sizing by felting?

A. The effect would be to destroy them.

Q. 53. Will you examine bat, Exhibit 19, and state what in

your judgment is its quality as to texture and structure,
883 compared with the hat bodies, or any of them, in the bundle marked Exhibit W?

A. This hat body, to wit, Exhibit 19, is very imperfect in its tip, and not to be compared in perfectness with Exhibit W. Exhibit 19 is a heavy hat, which makes imperfections less visible to inspection, as will appear by looking through the thin parts where it is very imperfect. Exhibit W is a light body, and perfect in all its parts.

ISRAEL D. CONDIT.

Sworn before me this 29th October, 1857.

884 R. E. STILWELL,
U. S. Commissioner.

Cross examination of Israel D. Condit, by Mr. Gifford, Monday, 2d November, 1857.

X 54. Are you now working under the patent reissued to the complainants?

A. I am.

X 55. Have you a continuous right under that patent?

A. My license extends to the end of the patent.

885 X 56. Are you under any restriction as to for whom you shall make hat bodies, or are you at liberty to make them for any one you please?

A. In the original license granted to me I was not restricted; subsequently an agreement was entered into confining the license to certain districts or limits.

X 57. Are you confined to certain districts or limits as to whom you shall make hat bodies for; and if yea, what district or limit, and what is the nature of such limitation or confinements?

886 A. I was so restricted to New Jersey, and I think the city of New York. I now speak from recollection, as I have not read my papers since they were handed to me.

X 58. Are you not at liberty to make hat bodies for hatters in Philadelphia?

A. I think not.

X 59. Are you certain about that?

A. That is my understanding, and I would not make them for hatters there.

887 (The testimony of this witness is objected to, on the ground that he is interested, and the cross-examination is continued subject to this objection.)

X 60. When did you first know Henry A. Wells, or see him?

A. I probably had known him twenty-five years ago. I really could not fix. I have known him since I have been in the hat

trade, which is since about 1830. I think he lived in the city of New York. He was one of the firm of Wells & Redfield.

X 61. State where you first met him, and under what
888 circumstances you then met him, if you remember.

A. I met him as one engaged in the hat trade, about the time I gave in my previous answer, about 1830.

X 62. You have stated that you used the Blanchard machine from 1836; how came you to adopt the use of that machine?

A. I purchased an interest in it because it was a new machine, and I was already in the business of making wool hat bodies. My attention was directed to it as a new improvement, and I be-
889 came interested in it by purchase.

X 63. Did you know Blanchard prior to hearing of his invention?

A. Only by reputation.

X 64. Do you know the difference between the Blanchard machine and the Blanchard machine with the James, Wells & Peck improvements?

A. Yes.

X 65. As you understand it, is the machine which was set forth in your direct examination as having been used by you, a
890 Blanchard machine, or the Blanchard machine with the James, Wells & Peck improvements?

A. The model which I use in my direct examination I stated was not exactly like the Blanchard machine as we use it, but it comprised substantially all the principles. The improvements made by James, Wells & Peck we never considered of any value.

X 66. Did you use those improvements?

A. I can't say that we did particularly, as the Blanchard machine contained about the same principles.

891 X 67. When you say "we" in your answer before the last, whom do you mean?

A. I mean Mr. Robert Peck and Alonzo A. Alvord, who were at that time my partners.

X 68. Can you state what were the James Wells and Peck improvements? and if so, do so.

A. I cannot state what they claimed, not having read the papers for many years.

X 69. Do you know the difference between a Blanchard machine without those improvements and a Blanchard machine
892 with those improvements? and if yea, state it.

A. At the time we did not consider the improvements amounted to anything—not worth the expenses incurred in taking out the patent.

X 70. Last question repeated.

A. There is substantially no difference between that and Mr. Blanchard's.

X 71. Do you know whether or not there is any difference
893 between a Blanchard machine without those improvements, and a Blanchard machine with those improvements? and if you do, then describe that difference.

A. The machines that we erected, or built, after I became interested, were so built, without any particular reference to the James, Wells & Peck patent, but contained some mechanical arrangements differing from the former machines built by James, Wells & Peck, at Brooklyn, a model of which I placed in the Patent Office.

X 72. Question repeated.

894 A. I have already said that they are substantially one and the same in principle.

X 73. Leave out your idea about substantially, and answer the question as put respecting "any difference."

A. When we built our machines the Blanchard, or James, Wells & Peck patent had not been issued, and in building our machines was not in any way referred to.

X 74. Is that all the answer you can give to that question?

A. I can only say that I know of no particular difference,
895 as no other machines were built than those already described.

X 75. How many affidavits, if any, have you made in behalf of the Wells patent?

A. I cannot say. I do not now remember of any, except one in Philadelphia.

X 76. Don't you remember of making an affidavit for the complainants in a suit in Boston on that patent?

A. I do not remember distinctly, but think it probable that I have done so.

X 77. Don't you remember making an affidavit for the
896 complainants in a suit in New Jersey on that patent?

A. As I stated before, I do not remember positively, but think it likely that I have done so.

X 78. In sizing hat bodies is there an operation called croseing the bats; and if so, what is it?

A. There is such a term made use of in the trade, which means that the two inner surfaces, coming in contact before the body is sufficiently hardened, uniting together, I mean the outer edges of the surfaces, where the body is folded, is united, forming a
897 welt, which is commonly called croseing.

X 79. In your last answer, you speak of two inner surfaces coming in contact, uniting together; explain what you mean fully.

A. I mean to explain it the same as this piece of paper being folded in shape like a hat body, that the outer edges, coming in contact with a layer inside, often leave a crose in the edge. This is a process used in hand-work, when bodies are made by hand.

X 80. Do you mean that there is an in-layer between the
898 bats in sizing?

A. No, sir; I mean in hardening.

X 81. In sizing hat bodies are not the surfaces constantly shifted by the operative, separating the two inner surfaces?

A. They are, although I state I am not a practical hatter by profession.

X 82. Do you know what that shifting of surfaces is for?

A. I think it is to keep the body uniform in the work
899 given to the body by the operator.

X 83. Do you know what that shifting of surfaces is called among practical hatters?

A. They may have technical names of which I am unacquainted.

X 84. Question repeated.

A. I know of no other reason for changing the position of the body, except for the purpose of giving the body regular and uniform work, so that when finished it may be uniformly
900 even, which I believe is called croseing. I believe that is the technical term.

X 85. Do you know what would be the effect as to the two inner surfaces of the bat, of sizing without croseing or shifting of surfaces?

A. It would be the same as I described in the hardening process. The two surfaces would unite together.

X 86. In the use of what you called the Blanchard machine, you mentioned the use of an eccentric in hardening; explain how that was used, or operated.

901 A. The web passed from the vellum, or wire cloth, to the hardening rollers, and by the use of the eccentric was hardened sufficiently hard to be handled.

X 87. Did the web go between the hardening rollers?

A. It did.

X 88. Did both of those rollers revolve, or only one?

A. I think they both revolved.

X 89. Was one of them jiggered, or moved with a reciprocating motion longitudinally upon the other?

A. It was.

902 X 90. How tightly were the bats, as they passed off the vellum, impinged or pressed between those hardening rollers?

A. It was the weight of the roller, and I don't remember anything more being added.

X 91. Do you know what that jigging motion of one of the rollers was for?

A. Yes.

X 92. State what.

A. It was used for the purpose of hardening the web.

903 X 92. How long did you use the Blanchard machine?

A. We purchased an interest in it in the year 1836, and was engaged with it until the spring of 1845.

X 94. Where did you carry on the business during all that time?

A. In Millburn.

X 95. In your direct examination you have stated that in the first experiments with the Blanchard machine, a fan was used. Do you mean an instrument which would create or put in motion a current of air?

904 A. I mean to say that a fan was used for that purpose.

X 96. Describe it particularly.

A. The fan was about four feet in diameter, with, as near as I can recollect, six wings.

X 97. I mean the fan you refer to in your answer to the eleventh interrogatory in chief.

A. There was a fan used in the Blanchard machine for the purpose of delivering or flinging the fur from the doffer. This fan was made by nailing four slips of wood upon a small cyl-

905 inder.

X 98. How large was that cylinder?

A. I should think about five or six inches in diameter before the wings were put upon it.

X 99. How large were the pieces of wood which you have stated were nailed on to the cylinder?

A. The pieces were thin, and projected from half an inch to an inch from the surface.

X 100. In your experiment with that device upon the Blanchard machine, how long did you try it?

906 A. They were used at Brooklyn when I first saw the machines, after I became connected with them. The machines were moved to New Jersey, and when we rebuilt we discarded the fan, and substituted the fancy.

X 101. Did you put the fancy in the place where you found the cylinder with the pieces of wood nailed to it?

A. I cannot say whether it was placed exactly on the same part of the doffer, as we had entirely new machines.

X 102. Was there a cover over this cylinder with the pieces of wood nailed to it?

907 A. The whole carding-machine was covered; I mean as represented in the Blanchard model shown, marked Exhibit 8.

X 103. Was that wooden cylinder with the wood nailed to it included under that cover as the fancy is in the model No. 8?

(Objected to as assuming that the model represents a cover to the fancy, which is not the case.)

A. It was.

X 104. Who had those machines in use in Brooklyn, and
908 how many were there?

A. I purchased my interest from Alvord & Peck. Alvord & Peck had them in use at the time I purchased my interest. I believe there were three machines—that is, three web machines.

X 105. What were they doing with them?

A. Forming bodies.

X 106. Did you examine their operation before you bought?
909 A. I did.

X 107. How did you like their operation?

A. I thought there was merit in it, although in many particulars it was imperfect.

X 108. Are you not aware, and have you not frequently stated, that about the time you commenced the manufacture of fur hat bodies by the use of the Blanchard machine, hatters or associations of hatters opposed it, or discountenanced the use of machinery for that purpose?

A. I found many of the hat manufacturers anxious to
910 have the machines succeed, but journeymen hatters were generally opposed to it.

X 109. In your direct examination you have stated that you experimented upon a cone, by placing it in a chamber similar to the Blanchard machine. When did you do that?

A. In the spring of 1845.

X 110. How long was you trying that experiment?

A. I cannot state exactly the time we were so engaged. Several weeks.

X 111. Do you mean that a machine was running several
911 weeks with a cone in the chamber?

A. No; I mean we were experimenting with the cone, trying to make hat bodies.

X 112. I want to know if you ever put a cone in the cnamber of the machine, or used, or attempted to use, a machine with the cone there—I mean yourself in person—and if you did, then describe how the cone was fixed in the chamber, its manner of operation, and the parts with which it was directly connected, as well as you are competent to do.

912 A. I personally superintended the experiments made with the cone, by placing the same in an air chamber attached to a carding machine, with a fan so placed as to exhaust the air through the cone, and tried many devices to make a hat body, but failed to lay the stuff.

(Answer objected to as a volunteer statement of the witness, and the commissioner is requested to call the attention of the witness to the question.)

The cone revolved, and we tried various methods to direct
913 the fur on to the cone in regulated quantities, required to lay a hat body, without success, and gave up the machine.

X 113. Now describe every method which you so tried to regulate the fur.

A. I could not describe accurately all the methods adopted, as they were merely experimental.

X 114. Can you describe any of those methods? and if so, do it particularly.

A. I cannot state particularly any plan, except that we
914 used partitions running from the carding machine to the cone, the object of which was to distribute the fur on the cone in such quantities as was required to lay the hat thick and thin, as is required to make a perfect hat body.

X 115. Could you not contrive any way of getting more fur at the base of the cone than at the tip?

A. I cannot now state, as I have before remarked, all the experiments which we then made. Our experiments ended in making a bat, and not a hat body.

X 116. Could you not contrive any way of getting the
915 fur on all sides of the revolving cone?

A. I think we did put the fur on all sides of the revolving cone.

X 117. What do you mean by an air chamber? Do you mean a chamber with or without air?

A. I mean a chamber similar to the one used in the Blanchard machine.

X 118. What do you understand characterizes that as an air chamber?

A. Being made expressly for that purpose.

916 X 119. For what purpose?

A. It excludes the outer air; and in exhausting the air from it, it takes only the air which is let into it.

X 120. Is any more air taken out of the Wells trunk which you now have in use than is let into it?

A. No; no more than is created by the action of the brush.

X 121. Do you mean that the action of the brush creates
917 air, or that it merely facilitates its going into the chamber?

A. I mean to say the velocity given to the brush creates a current of air.

X 122. Is that anything more or less than facilitating the introduction of air into the chamber? and if so, explain what it is more or less.

A. It facilitates the introduction of air into the chamber.

X 123. Question repeated.

A. I say that it facilitates it.

X 124. Question again repeated, and the commissioner
918 requested to again read it to him.

A. I give the same answer to the question that I did before.

X 125. Does not the trunk which you now have in operation exclude the air, except at the end where it is admitted and at the end where it is allowed to escape?

A. It does.

X 126. Do you mean to be understood as saying in your direct examination that fibres of fur are interlocked by wetting by hot water only? and if you do, then explain, if you can, how
919 wetting causes the interlocking.

A. I mean to say that the fur in its dry state does interlock or lie promiscuously upon the cone, and that the fibres or barbs of fur are interlocked by the operation of the heat and of the passage of the hot water through the fur, produces the first stages of the felting process.

X 127. What do you mean by interlocking?

A. I mean one particle of the fur interlocking with another, so as to form felt.

X 128. Do you mean by interlocking that the fibres are
920 thrust in or pass in among each other?

A. I mean that the fibres of fur which come into contact with each other interlock and commence the first action in felting.

X 129. Are you not aware that the shrinking of a bat or its diminishing in size is an effect of thrusting the fibres of fur more closely in among each other, such as felting?

A. That is the effect produced by the hot water.

X 130. Question repeated.

921 A. I do say that the fibres are carried more closely together by the action of the water.

X 131. Do you understand that the 129th question asked you anything about hot water?

A. I did understand that the question was asked me in my direct examination to that effect. I do not know that that question does ask me anything about water.

X 132. Then answer the 129th question, if you can, without reference to water?

A. I am not aware that felting of fur can be produced
922 without the use of water.

X 133. Don't you know that rubbing bats is the usual and proper way of felting, so far as you understand felting?

A. No, I do not consider the rubbing process merely to make the bat compact, so that it may be handled.

X 134. What do hatters do to felt a bat of fur; don't they rub it and roll it?

A. They dip it in hot water and roll it.

X 135. What good have you been in the habit of supposing the rolling of the bat, as you call it, to do?

923 A. Creating a friction, and some pressure in knitting the barbs of the fur together.

X 136. Did you suppose that the knitting of the barbs together had anything to do with felting?

A. I suppose they had.

X 137. Do you know what was the object of sizing in bats for making hats?

A. I believe the object is to make a felt.

X 138. Do you know of any hatter who sizes in without
924 working or rubbing the bat?

A. I don't know of any other manner than dipping in hot water and rolling.

X 139. How did you prepare your fur for putting it into the Blanchard machine, when you used that machine? Did you prepare it by the use of any other machine; and if yea, what machine?

A. We used the ordinary blowing machine.

X 140. Have you ever mixed cotton or silk with fur in
925 the manufacture of hat bodies?

A. I have mixed cotton and silk with fur.

Re-direct Examination by Mr. Keller.

Q. 141. Are the terms of your license under the Wells patent such as to compel you to work under it until the expiration of the patent, or are you at liberty to throw it up at any time?

A. There is a condition in the agreement whereby we can discontinue the agreement by giving a notice of so many days,
926 which I do not now recollect.

Q. 142. How often have you to make payments to the owners of the patent for the use of that invention?

A. Every quarter.

Q. 143. In the general practice of manufacturing bats, do those who form and harden the bodies also size, block, and finish them into hats?

(Objected to on the ground that the witness is not a practical hatter, as so stated when the defendants' counsel was cross-examining him.)

927 A. They do not.

Q. 144. State how the business is usually divided.

A. The stock is generally sent to the machine to be formed, and sent to the manufacturers to be made into hats, on account of those who furnish the stock.

Q. 145. State what operation the hat bodies have undergone when they are returned to be made into hats by those who furnish the stock?

(Same objection as above.)

A. They are formed and hardened, then they are called
928 hat bodies; then they pass into the hands of the hat manufacturer.

Q. 146. Do the fibres of silk and cotton felt?

A. No.

Q. 147. For what purpose did you use fur with silk and cotton, as stated in your answer to question 140?

A. For the purpose of cheapening the cost of the hat body.

Q. 148. Could you have made the hat body of silk or cotton, or both, without the fur; and if not, why not?

929 A. We could not, because the cotton and silk have no felting qualities.

Q. 149. In answer to cross-question 85, you have stated that the effect of sizing a bat, without croseing or shifting the surfaces, would be the same as you have stated in the hardening process; that the two surfaces would unite together; is the bat crosed when carried through the process of hardening?

A. I have stated that that was the hand process of hardening hat bodies. By our machine process it was essentially different;
930 it is crosed by the hand process.

Q. 150. By the hand process of hardening, is there anything, and if anything, what, put inside the bat?

A. An inlayer.

Q. 151. What is the inlayer used for?

A. Keeping the two surfaces from coming in contact.

Q. 152. Is an inlayer used in the process of sizing; and if not, why not?

A. It is not used, for the reason that the body is already felted enough in the process of hardening, to commence the sizing
931 process.

Q. 153. In the hardening process, what would be the result of permitting the inner surfaces of the bat to be in contact without an inlayer?

A. They would unite together.

Q. 154. What prevents them from uniting together in the sizing process, when, as you say, no inlayer is employed?

A. In the first process of sizing the body is lightly rolled and frequently crosed.

Q. 155. If not crosed during the process of sizing, would
932 the fibres constituting the two sides of the bat unite as firmly with each other as the fibres constituting each side of the bat?

(Objected to, for the reason that the witness has stated that he is not a hatter, and the question is leading, and on expert matter to a witness who has acknowledged that he is not competent as an expert.)

A. The two outer edges would unite together.

Q. 156. How would they, along the inner surfaces in
933 contact?

A. I should think they would not be likely to unite.

Q. 157. Do you think your right under the Wells patent valuable to you?

A. Yes.

Q. 158. How much do you pay every quarter?

A. $250.

Q. 159. In the use of your Wells machines, is it not the practice to roll the bats in wet cloths after being removed from the cone before they are put up for customers?

934 A. The bodies are all ready wet, having been immersed in hot water; they are then further hardened by rolling them in cloths.

Q. 160. Is not the inlayer you speak of put between the bats, after the bats have been hardened, and to shape the hat body by the hand process you have referred to?

A. I think not.

Q. 161. Do you mean that the bats are not hardened before the inlayer is put between them?

A. I mean that the inlayer is placed in the hat body
935 while in the process of hardening.

Q. 162. Question repeated.

A. In making a body by hand, I mean that the inlayer is placed inside the body to keep the two surfaces from coming in contact.

Q. 163. Do you know whether or not, in making hat bodies by hand, the bats are hardened before that inlayer is put between them?

A. In making bats it does not require an inlayer.

Q. 164. Question repeated.

936 A. Each bat is first hardened.

Q. 165. Do you not know that the inlayer is put between the bats to shape the hat body by, and to give it the right size?

A. I do not.

Q. 166. Will you swear that the inlayer is not put there for that purpose?

A. No, I will not.

ISRAEL D. CONDIT.

Sworn before me this 2d November, 1857.

937 R. E. STILWELL,
U. S. Commissioner.

UNITED STATES OF AMERICA,
Southern District of New York,
City, County, and State of New York, ss.

Be it remembered, that on this 30th day of October, in the year

938 of our Lord one thousand eight hundred and fifty-seven, I, Richard E. Stilwell, a commissioner, duly appointed by the circuit court of the United States, for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes
939 depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, in the city of New York, and the said southern district of New York, in the State aforesaid, Daniel Barnum, to testify and the truth to say, on the part and behalf of the complainants, in a certain suit or matter of controversy, now depending and undetermined, in the circuit court of the United States for
940 the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants.

And the said Daniel Barnum being about the age of 58 years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said Daniel Barnum, and he did thereupon depose, testify, and say as follows, namely:

941 I hereby certify that on the cross-examination of William Fosket, a letter was produced by plaintiffs' counsel, and put in evidence, and marked Ex. F; that the same was left in my possession, by me paged, and that the same has disappeared; that I have made search for the same, and that I am unable to find it.

R. E. STILWELL, *U. S. Com.*

Q. 1. State your name, age, residence, and occupation.

A. My name is Daniel Barnum; aged 58 years; reside in Jersey City, and am engaged in no particular business.

942 Q. 2. Did you have in your possession at any time a letter addressed to Rufus Brown, and signed William Fosket?

A. I did.

Q. 3. About how long was that letter in your possession?

A. I should think three or four days.

Q. 4. Did you read it; and if yea, about how often?

A. I should think I read it about four or five times.

Q. 5. Did you pay attention, and if yea, what attention, to its contents and phraseology?

943 A. I did pay attention, and particular attention, to its contents and phraseology.

Q. 6. Were you present during the cross-examination of William Fosket as a witness in this cause?

A. I was.

Q. 7. Do you know if that letter was produced and given in evidence by me during such cross-examination?

A. I do.

Q. 8. Do you remember the contents of said letter; and if yea, state such contents and phraseology as near as you can re-
944 member.

A. I do remember the contents, and am ready to produce, and do produce, such contents in writing, marked F, which writing contains, according to my best recollection, the phraseology and contents of said letter.

DANIEL BARNUM.

Sworn to before me this 30th Oct., 1857.

R. E. STILWELL, *U. S. Com.*

945 MERIDEN, *Dec.* 3*d*, 1856.

FRIEND RUFUS: I desire to convey the whole of our hat patent to Elbridge Brown. I believe the term of the patent runs to or expires in 1860, and if in this brief period it can be made available so that he will reward me, I will pay you three quarters of all I may thus receive for it, or more if you desire it.

I believe you hold three quarters, and I herewith enclose a blank deed, which you will please sign and return to me.

You will probably receive a letter from Mr. Brown on
946 the subject. WILLIAM FOSKET.

To RUFUS BROWN,
Palmer, Tree Rivers, Mass.

Exhibit F.

R. E. STILWELL, *U. S. Com.*

1 UNITED STATES OF AMERICA,
Southern District of New York, City,
County, and State of New York, ss.

2 Be it remembered, that on this eighth day of October, in the year of our Lord one thousand eight hundred and fifty-seven, I, R. E. Stilwell, a commissioner duly appointed by the circuit court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil
3 causes depending in the courts of the United States," passed March 1st, 1817, and the act entitled "An act to establish

the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, in the city of New York, in the said southern district of New York, in the State aforesaid, George Raymond, to testify and the truth to say, on the part and behalf of the defend-
4 ants, in a certain suit or matter of controversy, now depending and undetermined, in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Rublet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants.

And the said George Raymond being about the age of twenty years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said George Raymond, and he did thereupon depose, testify and say
5 as follows, viz:

Q. 1. What is your name, age, residence and occupation, and how long have you been so engaged?

A. My name is George Raymond, aged 20 years; residence Danbury, Conn., and have no particular occupation. I have worked at painting, hatting, and various other kinds of business.

Q. 2. What acquaintance or experience have you had at
6 the hat-body making?

A. I have worked on two different kinds of machines. I have worked on the Burr & Taylor and St. John machine, and also on the Cowperthwaite. I worked on the Burr and St. John machine for Tweedy & White, at Danbury, in a shop called the "Shelter Rock Shop," and also in their present shop. I have worked for Cowperthwaite in the Shelter Rock Shop. I worked for Tweedy & White about four years.

Q. 3. When and for how long a time did you work for
7 Geo. Cowperthwaite, the defendant?

A. I commenced in 1856, in August, somewhere near the middle or latter part; from that time to the first day of April, 1857.

Q. 4. Is there one of the Cowperthwaite machines, which you used during that time, now in this city?

A. There is.

(Mr. Harding, counsel for the defendant, now produces the machine for the inspection of the other side, and for the purposes of this examination. Mr. Keller, counsel for the complain-
8 ants, consents to its being so used, without requiring it to be made an exhibit, on account of its weight and size.

Counsel for the defendant states, that if the counsel for complainants wish to produce and use one of their full size machines, a similar consent on the part of the defendants will be given.)

Q. 5. Please examine model Exhibit 1, and state whether the

same corresponds or differs with the machine referred to in
9 the last answer.

A. It is the same.

Q. 6. How many machines were used by Cowperthwaite during the time you were with him, and how did they agree in form, size, and proportional parts with the large machine referred to in your last answer?

A. There were three; there was no difference only in width across the feed-table and length of the pickers.

Q. 7. Please state how the bat was formed on the machine used by Cowperthwaite, during all the time you worked for
10 him.

A. In the first place the boy that feeds on commences to feed on opposite to the brim of the cone, equal to the width of the brim. He feeds this on about a foot in length, according to the heft of the hat. He then begins to feed across, clear across the table, until the operator or the man that stands by the cone tells him that he has got tip enough, or motions to the same effect. The boy then begins to feed back again on the brim, as he did in the first place. This fur passes through the pickers to the
11 cone, on to the brim of the cone, before any other place on the cone; then, as the feed widens out, goes on to the whole length of the cone, until the operator tells him he has got enough on the tip or end of the cone; then, as I told you before, he motions him to feed again on the brim, so that the fur passes through on to the brim.

Q. 8. In what manner were the bats removed from the cone or form during all the time you were at Cowperthwaite's?

A. In the first place, after the bat was formed, the boy,
12 or operator, put on a perforated cover or cone over the bat. He then turned the cone around under a sort of a jigger. This cone or cover varied in size from two to three inches larger than the cone on which the bat was formed, in diameter I mean. This cover revolved with the inside cone and the bat. This jigger has rollers which move backward and forward, and give this cover a very slight motion, which felts the hat, one strip or section at a time the whole length of the cone—as it revolves around it, keeps a hardening by sections the felting. The exhaust or suc-
13 tion is the same under the jigger as when the bat was forming. This jigger, while another hat is forming on another cone when another hat is formed, we put another perforated cone or cover over the bat, then we turn this around to the jigger, and the one that was under the jigger a boy stands ready to take it and harden it more. The boy puts his hand on the outer cone and gives it the same motion that the jigger did. There is a knob on the end of the outer cone which he puts in the palm of his hand

and presses against it, and gives it an up and down mo-
14 tion to harden or felt the tip. When he thinks it is felted, he takes it off; the bat adheres to the inside of the outer cover. If it is felted, it will stay there; if not, it will fall down. If it is felted, he takes his fingers and pulls it down, and takes it out of the cone and folds it. There is no suction on while the boy is hardening; and instead of a suction there is a blast outward, which blows through the cone.

Q. 9. What is the condition and texture of the bat when so removed?

15 A. It is perfectly dry and felted, so that you can handle it without its falling to pieces.

Q. 10. What was done with the bats after they were so formed and removed?

A. They were taken by the hardener and looked at. If they were perfect, they were folded and placed into a steam-box or chest with drawers in it, and after they were sufficiently steamed they were taken out and put into a cloth, rolled and hardened in the cloth till they were sufficiently hard, and then were folded
16 and packed up.

Q. 11. Where was this steam-box during all the time you were at Cowperthwaite's?

A. In the first place it was in the forming room where the machine was, and from there it was moved out into an adjoining room.

Q. 12. Did any steam escape from the chest except when open to insert the bats? How tight was that chest?

A. Very little. The chest was as tight as could be made
17 with boards.

Q. 13. Have you ever formed bats on the machine when there was no steam in the chest?

A. Yes, sir; very often in the morning before there was any fire under the chest.

Q. 14. What effect had the presence of the steam-chest, or the leakage of any steam from it, on the formation of the bat, as far as you have observed?

A. Not any.

Q. 15. What facts did you notice which induced you to
18 come to this conclusion?

A. There was this: we formed them when there was no steam in the room or thereabouts; we formed them in the morning when there was no steam in the room, and we finally moved the chest or steam apparatus out of the room. I never noticed any difference. We moved that steam-chest out of the room about the first of February, and worked from that time until the first of April without it in the forming room.

Q. 16. Describe the mode of forming the bat on the Burr
19 & St. John machine as practised while you worked at Tweedy & White's factory.

A. In the first place, the boy begins and feeds on the whole width of the feed-apron or table; this passes through the feed-rollers, and the brush takes it from them and throws it through a trunk formed of copper and wood, and through this trunk on to the cone, the whole length from the tip to the brim. The mouth of this trunk is larger at the bottom than at the top, and admits more fur through the bottom and makes the brim heavier than the tip.

20 Q. 17. How was the fur thrown from and deposited on the cone in the Burr & St. John machine?

A. It was thrown against the cone the whole length of the cone, from the tip to the brim.

Q. 18. How did the fur come from the pickers in the Cowperthwaite machine?

A. It would go over, if not for the suction.

Q. 19. On what occasion have you observed this effect taking place, if ever, at the Cowperthwaite factory?

A. I noticed it at one time when the belt run off from the
21 pulley of the fan, and there was no suction on then. The fur passed from the pickers over the top of the cone, and flew about the room. It might not all have gone over, but the principal part did.

Q. 20. How was the bat removed from the cone in the Burr and St. John machine after it had been formed?

(Objected to as irrelevant to the issue; the issue being whether the defendants infringe what is claimed and described in the plaintiffs' patent, and not what is used at Tweedy & White's, in Danbury.)

22 A. In the first place there was a cloth put on to cover the tip of the hat, then there was a cloth put around the side, then there was a cover put over this to hold the cloth and bat on. It was then taken from the former and placed into a tub of hot water, and settled down into it; it was then raised up a third or half way; a man then took a dipper and poured eight or ten dippers of water on the tip, till he thought it was sufficiently wet, and he then raised it out of the tub, took off the cover, removed the side cloth, and then took off the tip cloth and turned the cone over, and placed the tip on a bench or a tub with
23 a cover over it. He then took his hand and loosened the bat from the cone; it then fell off: he took and folded it up and laid it one side.

Q. 21. What is the condition and texture of the bats as they are removed from the St. John and Burr machine?

A. The bat is perfectly wet and held together in that way, and not felted so but what they would blow to pieces if dry.

Q. 22. Have you ever seen those hats dry?

A. I have seen them when they have laid over Sunday from Saturday night, when the topmost bat of two or three dozen
24 laid together would be dry, so that you could take it in your hand and blow it all to pieces where it was dry.

Q. 23. How did these compare with the Cowperthwaite bat?

A. The Cowperthwaite bat was felted so that it would lay a year, I suppose, and be the same as it was when it was first taken off the cone.

Q. 24. What would be the effect of feeding the fur in the
25 Burr and St. John machine as you feed it on the Cowperthwaite machine?

(Objected to as calling for an expert opinion, when it has not been shown that the witness is an expert.)

A. The effect would be the same as though it was fed on as they usually do. They usually feed it clear across.

Q. 25. Did varying the feed on the Burr and St. John machine ever produce, to your knowledge, any effect on the formation of the bat?
26

(Objected to, as it has not yet been shown that the feed was
27 varied in the St. John and Burr machine.)

A. No, sir; I don't think it did.

Q. 26. What did you rely on in the Burr machine to produce a proper relative thickness of brim and tip in the bat?

A. Relied upon the mouth of the trunk, bending the mouth of the trunk either up smaller or larger.

Q. 27. When did you so adjust the mouth of the trunk, bending it up larger or smaller?

28 A. When we wanted a light tip we bent it up smaller; when we wanted a heavy tip we opened it; sometimes we had to do it every half dozen hats; sometimes we would not have to do it in running six dozen.

Q. 28. Could you harden the bat by the Burr process as practised by you, with a cone such as used by them, without the use of cloths? Have you ever noticed what the effect would be in such a case?

A. No sir, I don't think you could wet them so that they would be a passable hat, without the cloths. I have noticed fre-
29 quently where the cloths did not cover the bat, that in putting it in the water it would wash a hole in the bat.

Cross-examined by Counsel for Complainants.

Q. 29. When did you first begin at Cowperthwaite's to feed the fur on that side of the apron opposite the brim of the cone, without at the same time feeding it for the tip?

A. Always done it; always fed the brim first while I was there.

Q. 30. Have you not seen them feed the fur entirely across,

thickest opposite the brim, and thinnest towards the other side?

A. No sir, I never saw them feed clear across the table for the whole hat.

Q. 31. Did you not for some portion of the hat?

A. For some portion of the hat we fed all the way across.

Q. 32. And when so feeding did you not feed thickest opposite the brim?

A. Yes, sir, we did.

Q. 33. Would it not have taken less time if you had fed entirely across the apron during the forming of the whole hat?

A. We couldn't make a hat, not a passable hat.

Q. 34. Question repeated.

A. We couldn't make a passable hat; it would have taken less time for the fur to have gone through the pickers on to the cone by feeding clear across the apron, through the whole hat.

Q. 35. Did you ever try to make a bat by feeding entirely across during the entire operation?

A. No, sir.

Q. 36. How, then, do you know the feeding in that way would not make a passable hat?

A. I know for the reason that sometimes we didn't tell the boy to stop feeding for the tip soon enough, so that it made the tip too heavy, consequently had to be formed over.

Q. 37. What were your duties in Cowperthwaite's establishment?

A. My duty was to stand at the cone and tell the boys how to feed, and see that it was fed right.

Q. 38. Was that your whole duty during the time you worked there?

A. No, sir; after the hat was formed I had to put this outside cover on it, and turn it round under the jigger; sometimes I packed up hats, and sometimes I blowed fur.

Q. 39. Were you brought up regularly as a hatter?

A. No, sir, I was not.

Q. 40. Were you brought up a machinist?

A. No, sir; I most always worked about there some how.

Q. 41. Do you mean in planning and constructing machinery, or attending machinery when in operation?

A. Attending when in operation.

Q. 42. What were your duties at Tweedy & White's establishment?

A. I worked, while there, at every part of the work excepting hardening.

Q. 43. For what purpose were the bats steamed at Cowperthwaite's?

A. They were steamed to make them felt.

Q. 44. How long were they generally kept in the steam apparatus?

A. Sometimes five minutes, sometimes half an hour.

Q. 45. Were they not wet when taken out of the steam apparatus?

A. They were not wet, but merely dampened—some spots
36 on them where the steam had condensed, and the water dropped on them.

Q. 46. Were they not then felted by hand when taken out of the steam?

A. They was.

Q. 47. Was not this done in the same way and for the same purpose as at Tweedy & White's, after they had been immersed in hot water?

A. Yes, sir; I should say it was about the same.

Q. 48. Was not this felting done in both establishments for the purpose of hardening them, so that they could be sent to
37 the hatters to be sized?

A. Yes, sir.

Q. 49. When the bats at Cowperthwaite's are removed from the cone, are they sufficiently hardened to admit of packing and transportation with safety?

A. They could be packed so that they could be sent away.

Q. 50. Have you ever known them to be packed and sent away in that condition?

A. No, sir.

Q. 51. When the delivery aperture or mouth of the trunk
38 was altered by hand in the machine at Tweedy & White's, was it not when you wanted to change from making one kind of hats to another kind, differing either in size or in the relative varying thickness from brim to tip?

A. Yes, sir.

Q. 52. Did you ever time by a watch the length of time required for hardening a bat in the Cowperthwaite machine when there was steam discharged in the room and when there was not, or
39 examine the texture of the bat when removed from the cone, to determine accurately whether they were in the same conditions, and of these different circumstances?

(Objected to, because the question implies that the witness has said that steam was discharged into the room, when he has not.)

A. I never timed the hardening, and the bat when it came off was perfectly dry.

Q. 53. Did you examine them accurately during these different circumstances to determine whether they were equally well
40 hardened? and if so, state in what manner you made such examination and test.

A. I never examined them particularly to see whether there was any difference in them when we had steam in the room, and when there was no steam there; there never was steam enough escaped from the chest to make any difference.

Q. 54. Do you not know that the steam apparatus in the room where the machines were worked leaked, and that steam
41 escaped from the drawers when opened to put in and take out the bats?

A. Yes, sir; there was steam escaped from the drawers when they were opened; I think it leaked a little—not enough to see it escaping in a warm day.

Q. 55. Do you not know that the exhausting of the cones on the machines drew currents of air from all parts of the room towards the cones, and that the steam escaping from the apparatus would follow such currents?

A. Yes, sir; I think it did.

42 Q. 56. Was it not the practice at Tweedy & White's to harden the hats by hand directly after they were taken from the cones?

A. Sometimes they were hardened directly and sometimes they were not; I have known the time when they have run from 6 to 9 or 10 o'clock in the evening, and the bodies would lay till the next day before they would be hardened.

Q. 57. Was there any serious difficulty in hardening them the next day?

43 A. I couldn't say as to that; they were generally hardened; I never hardened myself.

Q. 58. Did you ever see the bodies made at Cowperthwaite's establishment just as they were taken from the cone, without doing anything else to them, lay over for a year?

A. No, sir, I never did; I have seen them lay over for a week or so.

Q. 59. Was this the general practice to let them lay over a week or so before hardening them by steam and hand?

44 A. No, sir; they were generally hardened right along as they came from the cone; one time we had two machines running and only one man to harden, and some lay over.

Q. 60. In answer to the 20th question, in your examination in chief, after describing that at Tweedy & White's after the bat has been covered with cloth, and the outer cone bat on, you say that it was then taken from the former. Did you mean by this, that it was taken from the cone stand of the machine?

45 A. I did.

Q. 61. You have stated that if the machines at Tweedy & White's were fed as the machines are fed at Cowperthwaite's, they would operate the same as if fed clear across the apron; have you ever tried to feed the said machines in that way?

A. No, sir; I never tried it.

Q. 62. In answer to the 28th question, on your examination in chief, you have stated that at Tweedy & White's the bats could not be dipped in hot water with the outer cone on them and
46 without the cloth surrounding the bat for the reason that

you observed that when a portion of the bat was not covered by the cloth it made a hole in the bat; did you ever try to dip them in hot water without the cloth wrapping, and with an outer perforated cone covering and fitting properly the entire bat, the said outer cone being put on whilst the fur is held by the exhaust?

A. No, sir; I never did try it.

Q. 63. Have you ever tried at Cowperthwaite's to harden the bats by the jigging of the outer cone when the hat was not held on the inner cone by the exhaust?

47 A. No, I believe not.

Direct Examination resumed.

Q. 64. How many hat bodies per day at Cowperthwaite's did you make after the steam-chest was removed from the room where the machines were, as compared with the number which you made per day when the steam-chest was in the room?

48 A. When the steam chest was in the room I believe we didn't run over two dozen a day; after it was taken out we run twenty dozen one day, and average from twelve to eighteen dozen.

Q. 65. How did the texture or condition of the hat bodies made after the steam-chest was removed compare with the texture and condition of the hat bodies made before?

(Objected to, as the witness has already testified that he did not examine under the said different conditions with a view to determine whether there was any difference.)

49 A. I never observed any difference in particular, not from that.

Q. 66. What complaint, or objection, or remark did you ever hear made about the condition or texture of the hat bodies in consequence of the removal of the steam-chest?

A. I don't remember of ever hearing anything said about it.

Q. 67. What difference did you ever observe in the number of hat bodies which you made per hour at any time in the day

50 when there was steam in the chest, when compared with the number of bodies made per hour when there was no steam in the chest?

(Objected to for the reason that the witness has already testified that he did not note at the time the difference in time required from the operation when the steam apparatus was at work and when it was not.)

A. I never took any notice.

Q. 68. How near was the steam-chest placed to the hat-body machine nearest to it, and how far from the machine most

51 distant from it?

A. The nearest, I should think, was about four foot; the farthest I should think was about 8 or 10 feet.

Q. 69. Could you ever perceive any difference? What difference could you perceive in the number of bodies made on the machine near to the steam chest as compared with that most distant?

A. I never took any notice. I don't think there was any difference.

52 Q. 70. How often were the windows of the room opened? (Objected to as assuming that they were opened.)

A. They were opened every day that it was warm enough.

Q. 71. What effect had the opening or closing of the windows on the number or condition of the bodies formed by these machines?

A. No effect, only this way, to blow the fur off the feed-table, when they were open, if there was a very strong wind.

53 Q. 72. How often, if ever, have you perceived currents of steam passing from the steam chest and into the forming cone?

A. I never noticed it, only very cold mornings, when the room was full of steam, and just started the machine.

Q. 73. How was it at all other times?

A. I never saw any.

Q. 74. What difference was there observable in the formation of the bat as to the time occupied and its condition when there was steam in the room, and at other times during the day?

54 (Objected to, as the same question has been before put by defendants' counsel to the witness, in various forms, and the witness has invariably answered that he has not observed.)

A. I never noticed any difference particularly.

Q. 75. Was or was not your position and duties such as to have caused you to perceive such difference, had any existed?

A. Yes, sir.

55 Q. 76. What reason, based on your experience as cone-tender at Cowperthwaite's factory, during the time you have stated, have you to believe that the presence or absence of steam in the machine-room affects the time occupied in the formation of the bat, or the condition and texture of the bat formed?

(Objected to, as assuming that the witness has reasons for believing that the presence or absence of steam in the room affects the condition of the bat or the operation in forming it.)

56 Q. 77. Have you any reason for believing that the presence or absence of steam in the machine-room affects the time occupied in the formation of the bat, or the condition and texture of the bat formed?

(Objected to, as the witness has repeatedly testified that he had not observed whether the presence or absence of steam affected the time required for the operation, or the texture of the bat.)

A. I don't know that I have.

Q. 78. Did they take any precaution at Tweedy & White's
57 factory in reference to bats formed one day and hardened the next; and if so, what?

A. They used to take a wet cloth and throw over them nights. They didn't always do it; they did it sometimes.

Cross-examination resumed.

Q. 79. How many hours did it take to make the twenty dozen of bodies in one day at Cowperthwaite's to which you have testified in your examination in chief?

58 A. Not quite ten hours.

Q. 80. Were they all made on one machine?

A. Yes, sir.

Q. 81. Were they the largest size bodies?

A. No, sir, they were not; they were medium.

Q. 82. When the machine run but 10 dozen bodies per day with the steam-chest in the room, did it form as many bodies as it was capable of forming?

A. No, sir; I think not quite.

Q. 83. Was the machine capable of forming more bodies
59 in a given time when the steam-chest was out of the room than when it was in the room?

A. No, sir; I don't think it was.

Q. 84. In whose employ are you now?

A. Nobody's.

GEO. N. RAYMOND.

Sworn to before me this 8th day of October, 1857.

R. E. STILWELL,
U. S. Com.

1 UNITED STATES OF AMERICA,
Southern District of New York,
City, County, and State of New York, ss.

2 Be it remembered, that on this eighth day of October, in the year of our Lord one thousand eight hundred and fifty-seven, I, R. E. Stilwell, a commissioner, duly appointed by the circuit court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the
3 more convenient taking of affidavits and bail in civil causes depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my

office, in the city of New York, in the said southern district of New York, in the State aforesaid, Joseph W. Robinson, to testify and the truth to say, on the part and behalf of the de-
4 fendants, in a certain suit or matter of controversy now depending and undetermined in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants. And the said Joseph W. Robinson being about the age of 51 years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said Jo-
5 seph W. Robinson, and he did thereupon depose, testify, and say as follows, viz:

Q. 1. What is your name, age, residence, and occupation, and how long have you been in that occupation?

A. I am fifty-one years of age; residence Danbury, Connecticut; my occupation now is working in the fur business; I have been so engaged since last June.

Q. 2. Have you worked on hat-body machines; and if so, on what machines, and for whom?

6 A. I have. I commenced working on the Burr machine either eight or nine years ago last May, I can't tell which; I think I worked on it seven years. Then a year ago last February I commenced working for George E. Cowperthwaite, and continued so till he stopped.

Q. 3. Please examine the large Cowperthwaite machine now present, and state if that was one of the machines on which you worked during that time for Cowperthwaite.

A. It was.

Q. 4. How many were there of these machines, and in
7 what respects did they agree or differ from the machine now present?

A. There were three of them; they were all alike, I believe.

Q. 5. Please describe how the bat was formed on these machines as used at Cowperthwaite's during all the time that you worked for him.

A. We first commenced feeding on the opposite side to make the brim and side crown, and that run for a foot into the pickers, and then we commenced feeding right straight across the ma-
8 chine till the tip and square was heavy enough; then the residue was put back and fed on the brim; the cover then was placed on over the bat; then it was swung around under the jigger; then they commenced forming the other hat; as soon as that was formed there is another cover taken and put top of that the same as the other; then that is swung under the jigger, and the boy hardens the other one that has come out from under the

jigger; the boy then keeps on hardening it while the other is formed; then the boy takes it off and lays it aside on a bench.

Q. 6. How is the fur deposited on the cone as it left the
9 pickers during the several stages of the feeding operation mentioned by you in your answer?

A. As it leaves the pickers it comes out on to the cone, almost all round the cone.

Q. 7. Have you ever noticed what was the course of the fur when the exhaust was thrown off on the Cowperthwaite machine?

A. Generally speaking, it went right over the top of the cone.

Q. 8. Please describe how the bat was formed on the Burr
10 machine when you worked on it.

A. Commenced feeding on right straight across the machine, and remained so feeding on till they formed the hat.

Q. 9. How was the bat removed from the cone on which it was formed?

A. We first put a tip cloth on, then a side cloth, then the cover, then removed it to a tub where there was a rack; then we pushed it down in the tub slowly, and let it remain there about half a minute; then drew it up about one-third of the way and poured on some 7 or eight dippers of water; then we drew it out of
11 the tub; then set it down on to a dripping tub, took off the cover, tip cloth and side cloth; then turned the cone over on to the tip; then loosened the hat around the brim, and it falls off on to the tub, and double it up and lay it aside.

Q. 10. By what means did you regulate the proper relative thickness of the tip and brim of the bat on the Burr machine?

A. The bottom part of the trunk was wood, sides copper, and the top was wood, which slid up and down; when the cone
12 was put on to the machine that trunk was set to it; then after they made a hat, to see whether it was right or not; if it was not, they altered it; the alteration was made by bending up the front of the trunk or opening it.

Q. 11. How did the condition and texture of the bats made on the Burr machine compare with the condition and texture of those made on the Cowperthwaite machine?

A. Those that were made on the Burr machine were wet;
13 those made on the Cowperthwaite machine very dry and hard.

Q. 12. Do you remember a steam chest in the forming-room? If so, state how long it was there?

A. I remember a steam-chest there; I think it must have been there six months or more.

Q. 13. Was it removed, and how long did you run after it was removed?

A. It was removed, and I think about two months.

Q. 14. What was the condition of that steam-chest, and how much steam escaped from it?

14 A. The steam-chest was placed on top of a stove with a *a* boiler in it; the box top of that; I believe there were four drawers in it; there was not a great deal of steam escaped from it; only when they opened the drawers the steam escaped.

Q. 15. What effect had the removal of the steam-chest on the condition and texture of the bats, or on the number which it would make in a given time?

A. None.

Q. 16. Please state whether or not steam was permitted
15 to escape by you, or any other person to your knowledge, for the purpose of effecting the formation of the bat.

A. No, sir.

Q. 17. While the steam-chest was in the room, was the forming machine used at times when there was no steam in the chest?

A. They were.

Q. 18. What effect had the presence or absence of steam in the chest on the formation of the bat?

A. None that I could ever perceive.

16 Q. 19. What effect had the opening or closing of the windows on the formation of the bat?

A. If there was a strong wind it made an alteration; when there was no wind it didn't; the effect of a strong wind was to blow the fur away from the cone.

Q. 20. In feeding the fur in the Cowperthwaite machine, how did the boy know when to stop feeding on to the brim alone, and begin to feed all the way across the apron; and how did he know when to feed back again on the brim as you have stated?

17 A. When I got ready to have him, and told him when there was enough there, then I told him to feed back on to the other side.

Q. 21. What was your position and duties in the Cowperthwaite's works?

A. When stock come there I used to put it down on the book; tied up the hats after they were formed, and charged them on the book; then I used to tend the machine; I stood by the tip of the cone to see that the hat was formed right.

18 Q. 22. How could you, on the Burr machine, vary the feed so as to vary the relative thickness of the brim and tip?

A. Well, I don't think you could.

Cross-examined.

Q. 23. If you fed unequally on the Burr machine in the direction of the length of the apron, would not it vary the thickness of the bat in the direction of the circumference?

19 A. I think it would, sir.

Q. 24. Would not the same thing take place in the Cowperthwaite machine?

A. Yes, sir; I think it would in any machine.

Q. 25. In the Cowperthwaite machines was not the fur fed across the apron during some portion of the operation, so as to throw fur on the entire length of the cone at the same time?

A. It did.

Q. 26. Was not the fur deposited mainly on a section, a
20 portion of the circumference of the cone?

A. About two-thirds of the way round the cone.

Q. 27. Assuming it to have been deposited on about two-thirds of the circumference of the cone, was not the fur deposited thicker about the middle of that section, and gradually thinner towards each side?

A. My opinion was that the heaviest part of it went on to the top of the cone; I am not positive about it.

Q. 28. Was not the thickest part, instead of being directly on top of the cone, a little towards the picker?

21 A. I shouldn't think it was.

Q. 29. Have you any positive knowledge on the subject?

A. Nothing more than what I could judge by my eye, standing close to it and looking at it.

Q. 30. Did you have your attention called directly to it at the time the machine was in operation, so as to enable you to swear, at this distance of time, positively that the thickest portion of the fur was deposited directly on the top of the cone, instead of a little towards the pickers?

22 A. Nothing more than what I have said before, judging by my eye; I don't know that my attention has ever been called particularly to it; I don't think it has.

Q. 31. About how far beyond the cone did the pickers throw the fur when the exhaust was suspended from the cone?

A. The principal part of it would go over the cone, part of it would drop down each side, and some of it would fly up around room.

Q. 32. When you fed the fur entirely across the apron,
23 that is in that part of the operation in which you threw the fur on the entire length of the cone, did not the pickers, at that time, throw more fur on the brim than on the tip?

A. I don't know as they did.

Q. 33. Did you feed the machines?

A. No, sir; but gave directions.

Q. 34. Did you not give directions to feed the fur thicker on that side of the apron towards the brim of the cone than towards the tip?

A. Well, I don't think I did; I have no recollection about
24 that; I calculate to have it fed on even.

Q. 35. Can you swear that the fur was fed on even on all the machines?

A. I cannot.

Q. 36. What was the purpose of steaming the bats after they were removed from the cone?

A. To harden them.

Q. 37. Were they not hardened enough on the cone?

A. They were not, as a general thing.

Q. 38. They were hardened enough, however, to admit of
25 taking them off and handling them, were they not?

A. They were.

Q. 39. How long did you keep them in the steam-chest?

A. The hardener would take and put them in. I suppose they remained there about two minutes.

Q. 40. Did they not become saturated with steam, so as to be moist or wet when taken out of the steam-chest?

A. They were moist and hot.

Q. 41. When the drawers of the steam-chest were open to put in or take out the bats, did not the steam have free discharge into the room?

26 A. The steam came into the room while it was open. It was open just long enough to take out two hats and put in two.

Q. 42. Did you ever make any experiment with a view to determine accurately whether there was any difference either in the length of time required for hardening on the cone or in the degree of hardening when the steam apparatus was in operation and when it was not? and if yea, state what was the nature of such experiment or test, and how it was constructed.

27 A. I never made any.

Q. 43. Do you know if the machines, or either of them, on which you worked at the Shelter Rock factory for Cowperthwaite, had been previously used at Hurlbert's factory?

A. One of them had.

Q. 44. Do you not know that Alva B. Taylor was owner of one or all of these machines?

A. No, sir, I do not; I believe I never saw him but once.

Q. 45. Where was he when you saw him?

A. I saw him at his office this morning; though I may
28 have seen him, I did not know him.

Q. 46. Did you have any conversation with him in reference to this case?

A. I have not.

Q. 47. Have you not said heretofore that Taylor was the owner of the machine or machines used by Cowperthwaite?

A. I have no recollection of ever saying so.

Q. 48. Did you not say so, or words to that effect, to E. M. Jones, foreman of White's factory, within a month, in the town of Danbury, State of Connecticut?

29 A. I have no recollection of saying any such thing to him, to my knowledge.

Q. 49. In conversation with E. M. Jones, foreman in White's factory, and in the town of Danbury, did you not say to him, in speaking about the machines at Cowperthwaite's, that Taylor was at the bottom of the matter, or words to that effect?

A. I have no recollection of it.

Q. 50. Did you not converse with E. M. Jones about the ownership of these machines?

30 (Objected to as irrelevant.)

A. I don't know but I have said to Mr. Jones that it was Mr. Taylor's patent.

Q. 51. How did you know that it was Mr. Taylor's patent?

(Objected to as irrelevant.)

A. Nothing more than hearsay.

Q. 52. From whom did you hear it?

(Objected to as irrelevant.)

A. I know it was talked of in the shop among all of us.

31 I don't know whether Mr. Cowperthwaite told me so or not.

Direct Examination resumed.

Q. 53. You have stated in your cross-examination that you did not perceive that the fur fell on the cone a little towards the picker rather than directly on top. Please state whether or not position of the top picker was ever changed so as to be further forward

32 than it is now placed in the large machine.

(Objected to as not responsive to any new matters brought out on the cross-examination.)

A. It is set now as it always has been.

Q. 54. On what position of the circumference of the cone was the fur deposited in the Burr machine?

(Objected to as not responsive to any new matter brought out on the cross-examination.)

A. I suppose it to be the whole width of the mouth of the trunk.

33 Q. 55. For how long a time were you cone-tender for George Cowperthwaite?

A. I believe it was 13 months.

Cross-examination resumed.

Q. 56. Do you not know that on the Burr machine the fur is deposited on a section of the cone wider than the mouth, or delivery aperture of the trunk?

A. Well, I won't be positive but what it might be a little wider than the mouth of the trunk—how much wider I can't tell;

34 I am positive it is as wide as the trunk, and it may be a little wider.

Q. 57. How long is it since you last worked on the Cowperthwaite machine?

A. I think it was on the first of April last.

Q. 58. Is your recollection at this distance of time sufficiently accurate to enable you to swear that the upper picker-roller is in precisely the same position that it always was when the machine was in use?

A. I should think this was in the same position; I should
35 think it was now as it has always been.

Q. 59. Question repeated.

A. We generally put the picker back as far as it will go, so as not to interfere with the back board. The machine I generally work is so fixed that it can't be altered.

(Answer objected to as not responsive to the question.)

Q. 60. Question repeated.

A. I think it is.

Q. 61. What relationship exists between you and the defendant Cowperthwaite?

36 A. It is said that my father and his mother were brother and sister.

Q. 62. Are you a hatter by trade?

A. I served an apprenticeship at comb making; five or six years after that I worked at silk hat finishing.

Q. 63. That consists in covering the hat body, when finished, with silk plush, does it not?

A. It does.

Direct Examination resumed.

37 Q. 64. Have you worked in any other way in connection with fur?

A. I have blowed fur.

Q. 65. For how long a time?

A. I may have worked two or three years.

JOSEPH W. ROBINSON.

38 Subscribed and sworn to before me, this 8th day of Oct., 1857.

KENNETH G. WHITE, *U. S. Com'r.*

1 UNITED STATES OF AMERICA,
Southern District of New York, City, County, and State of New York, ss.

2 Be it remembered, that on this eighth day of October, in the year of our Lord one thousand eight hundred and fifty-seven, I, Kenneth G. White, a commissioner duly appointed by the circuit court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of

Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil
3 causes depending in the courts of the United States," passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, No. 9, College Place, in the city of New York, in the said southern district of New York, in the State aforesaid, David R. Brown, to testify and the truth to say, on the part and
4 behalf of the defendants, in a certain suit or matter of controversy, now depending and undetermined, in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants.

And the said David R. Brown being about the age of twenty-five years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said David R. Brown, and he did thereupon depose, testify and say
5 as follows, viz:

Q. 1. What is your name, age, residence, and occupation?

A. David R. Brown; aged 25 years; residence, Danbury, Connecticut; occupation, hatter.

Q. 2. Are you acquainted with the Burr and St. John hat-body machine?

A. I have seen it in operation a good many times.

Q. 3. Did you work for George Cowperthwaite on his
6 hat-body machines; and if so, when, and for how long a time?

A. I worked for him at hardening from the 25th of September, 1856, to the 1st of April, 1857.

Q. 4. Please examine the large machine now present, and state whether it is one of the machines used by Cowperthwaite while you worked for him.

A. I have examined it, and it is the same as used by Cowperthwaite while I worked for him.

Q. 5. How many of these machines had Cowperthwaite during the time that you worked for him, and did they agree or
7 differ from this large machine now present?

A. He had three of the machines spoken of, and were the same with the exception of one; that one had a feeding-table wider than the rest, and pickers longer.

Q. 6. Please describe how the bat was formed on the machine

mentioned by you during all the time that you were with Cowperthwaite.

A. In the first place fur was fed on the feeding-cloth or table by a boy opposite the brim of the cone, about a foot in length and sufficient width for the brim, and that passed through the
8 pickers on to the brim of the cone or former; then the boy gradually widened out the feed or fur the full width of the table, and the fur passed through the pickers the full length of the cone, until the man standing at the end of the cone or former said there was sufficient tip and square; if there was any fur remaining after that of the hat, it was fed on to the table opposite the brim of the cone, as in the first place, and passed through the pickers on to the brim of the cone.

Q. 7. What was the position of the upper picker on the
9 machines during all the time that you were with Cowperthwaite?

A. It was placed as far back as the castings would allow it to go.

Q. 8. Have you ever observed what course the fur took after leaving the picker when the exhaust was thrown off?

A. I have; the main body of the fur passed straight over the cone.

Q. 9. When the bat was formed upon the cone, as you have described in a previous answer, how was it removed from the cone on which it had been formed during all the time you were
10 at Cowperthwaite's?

A. In the first place the man that tended the cone or former places a perforated cone or cover over the stationary cone, bat and all; this cone or cover is about two inches larger in diameter than the cone that the bat is formed on; the covers vary some in size; then the cone-stand is turned around about one-third of a circle under a jigger, as described in the patent; when turned around under this jigger the suction or exhaust is the same
11 as when the hat is forming; it is kept under this jigger while another bat is forming, as first described; this jigger only jiggers or felts it in narrow places on the top, as the cone revolves, and is jiggered there till another bat is formed; when the other bat is formed there is a cone or cover placed over as before, and that is turned under the jigger, and the one that is under the jigger is taken by a boy and turned round about the third of the circle; when in this position the suction is taken off by means of a board placed inside of the cone-stand, and instead of suction
12 it blows a little into the inside of the cone; when the boy gets it turned round to this place he hardens or felts it by the means of rubbing or shoving, while the cone and cover revolve together; when he has the side and brim sufficiently hardened, he places the palm of his hand upon the tip of the outside cover or

cone, and by means of rubbing the cone or cover up and down against the bat and inner cone, he hardens or felts the tip of the bat; when sufficiently hardened or felted he draws off the outside cone or cover, and the bat adheres to the inside of the cone
13 or cover if sufficiently hardened; when he has drawn this cone or cover off he places it under his arm, takes hold of the edge of the bat, about the middle of the edge of the brim, and from the top drops it down to the lower side, and then folds the two sides together, takes it out of the cone or cover, then places it on a table near the machine.

Q. 10. What was next done with the bat?

A. It was then taken by the hardener and examined, and if considered perfect was cropped, or the edge of the brim straightened, and then placed in a steam-chest to steam, and when suffi-
14 ciently steamed was taken out and rolled in a cloth until sufficiently felted to be sent to the shop to be sized.

Q. 11. What experience have you had in making and hardening bats by the old or hand-process?

A. I have worked at making hats by hand in the old way when an apprentice, but not since; since that time I have worked on machine hats.

Q. 12. Please describe the process of forming, and also that of hardening a hat by the old process.

A. In the first place the fur was placed upon a table or
15 hurl, and by means of a bow, which is something like 7 or 8 feet long, with heads at each, and with cat-gut string fastened over the heads at each end; by means of this bow held in your left hand, and a pin with a head to it in your right hand, the fur is bowed out or scattered into a bat, varying in thickness from brim to tip; there are two of these bats bowed alike; never more than one-half of the fur for a hat is put into either bat; when you get your bat bowed, it is then hardened down by a basket, so called, first commencing at the edges of the bat to harden
16 it, and keep on hardening towards the middle, till you get it sufficiently hardened with the basket, and then there is a leather placed upon the bat, and, by means of a rubbing, is sufficiently hardened to put together to make the body; when sufficiently hardened there is a paper placed upon the bat, turned down in the right shape for the body, and this bat is turned over this paper; the sides and tip are made smooth by means of cropping and straining; when turned down sufficiently smooth the other bat is bowed in the same manner as the first, and is placed on
17 the other bat and turned over in the same way and felted together by means of folding them up in a damp cloth prepared for the purpose, and when sufficiently felted in this way it is taken to the kettle in the sizing shop and sized.

Q. 13. How does the mode of hardening or felting the bat in the

old process, after it has been completely formed, compare with the mode of hardening the bat after it is removed from the former in the Cowperthwaite factory while you were there?

18 A. They are on the same principle; in the old-fashioned way, by hand, they are hardened by means of folding them in a damp cloth, and on the Cowperthwaite machine they are hardened by means of placing them in a box and steaming, and then taken out and folded up in a cloth and hardened, which is a little quicker than the old-fashioned way.

Q. 14. What is the effect of steaming them in the steam-chest in the Cowperthwaite factory after their removal from the cone?

A. It heats and dampens them a little, so that they will
19 felt down quicker than they would without steaming.

Q. 15. Describe how the bat is formed in the Burr machine referred to by you.

A. In the first place the fur is placed upon the feeding-cloth or table, the full width of the table, in equal thicknesses across the table, and passes through the feeders, and is taken by a brush and thrown through a copper trunk on to a perforated cone in narrow sheets, the full length of the cone from brim to tip; this
20 cone, standing upon a cone-stand, brim downwards, revolves; the fur is held upon this cone by means of an exhaust or fan under the cone-stand; the hat is varied as for heft, at the tip or brim, by means of varying the mouth of the said trunk.

Q. 16. How does the mode in which the fur deposits itself on the cone in the Burr machine compare with the mode in which it deposits itself in the Cowperthwaite machine?

(Objected to as calling for an expert opinion, it not having been shown that the witness is an expert.

21 The counsel for the defendant requests the witness to state the result of his observations in answering the previous question.)

A. In the Cowperthwaite machine, in the first place, it is deposited upon the brim of sufficient width for the brim, until the cone has revolved several times, and then it is deposited from tip to brim until there is sufficient tip and square, and then the remainder is deposited upon the brim, as in the first place, if there is any remainder; on the Burr machine it is deposited from tip to brim in narrow sheets, while the cone is revolving, until
22 the hat is finished, and is varied as to heft, from tip to brim, by means of varying the mouth of the trunk of the said machine.

Q. 17. How was the bat removed from the cone on which it had been formed on the Burr machine?

A. In the first place there is a wet cloth placed upon the tip of the bat and cone, and another wet cloth wound around the bat and cone on the outside, and a perforated cover without any tip placed

over these cloths, bat, and cone, while standing upon the cone-
23 stand; it is then taken from the cone-stand and placed on a rack in a tub or vat of warm water; it is then pressed slowly down into the water; when sufficiently wet it is drawn up about one-third or half of the way out of the water, and with a dipper there are several dippers of warm water poured upon the tip, bat, and cone; it is then taken out from the tub or bat and placed upon another tub; the outside cover is then taken off and the cloths carefully removed from the bat and taken off; the bat and cone is then turned tip side down, and the bat is carefully shoved
24 off by means of the hand; it is then taken and folded up and laid one side.

Adjourned to the 9th, at 10 a. m.

Sept. 9th.—Present, the parties with their counsel.

Q. 18. What was done with the bat after it was so removed from the Burr machine?

A. It was taken by the man who hardens or felts the hats, and in the first place the water is squeezed out by means of passing through rollers used for that purpose; he then takes the
25 bats and folds them in cloths and rolls until sufficiently hardened to be sent to the sizing shop.

Q. 19. How does the condition and texture of the bat as it comes from the Cowperthwaite machine compare with the condition and texture of the bat as it comes from the Burr machine?

A. The *hat* when it comes from the Cowperthwaite machine is perfectly dry, and sufficiently hardened or felted to be handled. The bat when taken from the Burr machine is not felted or hardened; it is only wet and matted together.

26 Q. 20. What direction does the fur take as it leaves the Cowperthwaite pickers, if there be no exhaust in the cone?

A. The fur passes over the cone and flies about the room.

Q. 21. How does the fur leave the trunk of the Burr machine?

A. It passes straight from the trunk in narrow sheets, wider and thicker at the brim than at the tip.

Q. 22. Where was the steaming apparatus or chest at the Cowperthwaite factory during all the time you were there?

27 A. In the first place it was in the room with the machine; it was afterwards removed to the adjoining room.

Q. 23. While it was in the room how much steam escaped from it, and was such escape of steam intentional or accidental?

A. I could not say how much steam escaped from the chest precisely, but we kept all the steam in the chest that we could; we could not raise but a little steam at any time; the apparatus
28 that we had for steaming was a coal stove, and an old-fashioned kettle, such as farmers use, was placed upon the stove, and covered over with a flat board on the top, and we used to put in about 10 or 12 pails of water; the chest was placed on top

of this kettle; when the fire burned good we could raise sufficient steam for the purpose of dampening the bats, but the draft of the machines was so strong that it drawed the draft out of the mouth of the stove, instead of going up the chimney, and for that reason we could not raise much steam when the machine or machines were running; we had to stop them several times in the
29 course of the day that the fire might get started up.

Q. 24. What effect had the presence of the steam-chest in the machine room on the formation or hardening of the bats while on the cone?

A. None that I ever observed.

Q. 25. How did the number of bats and their condition and texture, as formed while the steam-chest was in the machine room, compare with the number, condition, and texture of the bats after the steam-chest was removed?

30 A. The number of bats formed was greater after the steam-chest was removed than when it was in the same room; I observed no difference in the texture or formation of the bats.

Q. 26. What were your duties at the factory, and what opportunity did they afford you for observing the number, condition and texture of bats formed at different times?

A. My duties in Cowperthwaite's shop were to harden or felt the bats, when removed from the machine; my opportunities for observing the texture and condition of the bats were good; I had to examine all the bats removed from the machine that I
31 hardened after, while the steam-chest was in the room where the machines were; when the steam-chest was removed into the adjoining room, I hardened all the hats that the Cowperthwaite machine formed, until the first of April, 1857.

Q. 27. How did the number of hats formed per hour or day, at these two periods of time, compare?

A. When the steam-chest was in the room, we used to average about 10 dozen per day by each machine; when the steam-chest was removed into the adjoining room, we used to average
32 from twelve to eighteen dozen per day on each machine; while the steam-chest was in the other room, we never run but one of the Cowperthwaite machines at a time.

Q. 28. Have you ever seen a bat formed by the Burr machine after it had become dry, and before it had been felted, subsequently to its removal from the cone?

A. No, sir.

Q. 29. Have you worked upon any other machine while at Cowperthwaite's for the formation of hat bodies, different
33 in construction from the three of which you have been heretofore interrogated? if so, describe the construction of that machine.

A. I have worked on a different machine in Cowperthwaite's

shop; it consisted of a feeding-table or apron, and a cone-stand or fan-box, with a suction or fan underneath, similar to the one in the Burr machine; on this cone-stand there was a revolving cone or former, similar to the Burr machine; over this cone-stand there was a chamber placed in size to suit; and from this feeding-
34 table I have spoken of, there is a trunk passing into the chamber; at the end of this trunk, next to the feeding-table, over the feeding-cloth, there is a metal plate, held down by springs to the feeding-cloth; across the edge of this plate there is a cat-gut bow-string, similar to the one used by hatters when making hats by the hand process; when the machine is in operation, the bow-string is played by means of a pulley, with pins fastened on to it.

Q. 30. Please describe the mode in which the hat was formed in that machine.

35 A. In the first place we placed a stiff grass cloth or cover over the frame of the cone or former; then the fur was fed on the feeding-cloth or table, the full width across the table, in equal thicknesses; the fur then passed under this plate that I have spoken of, and was held snug to the feeding-cloth, while the bow-string that I have spoken of whipped or snapped it off into the trunk, and by means of the suction inside of the chamber, and the current of air passing in over and under the feeding-table, the fur was carried through the trunk in quantities larger on the
36 side of the cone towards the trunk than on the other side; the suction being stronger at the base or brim of the cone, at first there was more fur drawn there than at the tip; the current gradually decreasing at the base, and by means of air passing under the side at the bottom of the chamber, there was sufficient quantities of fur carried to the top of the cone or former to make the tip of the bat.

Q. 31. How did the bat so formed compare in the relative thickness of its parts, with bats formed on the Burr machine or on the Cowperthwaite machine?

37 A. They were about the same; no difference that I observed.

Q. 32. What was the relative thickness of the several parts of the bats made on this machine?

A. They were in equal thicknesses around the circumference of the cone, and varying in thickness from brim to tip, as in bats made by other machines, or by hand process.

Q. 33. How was the bat hardened on this machine?

A. It was hardened by means of a conical roller pressed
38 against the side of the cone and bat, and revolving all the while the bat was forming. This roller had a jigger motion up and down against the side; when the bat was formed and sufficiently hardened by means of this conical roller on the side,

the tip was then hardened by means of patting with the palm of your hand upon the tip of the bat and cone.

Q. 34. What was next done ordinarily?

A. The exhaust was first thrown off, then the conical roller was placed one side, then by means of a pin or other instrument
39 the pin was put through the tip of the bat and grass-cloth cover, and taken off from the cone or former and placed on a damp cloth, folded up and hardened, as in the process of hardening hand-made bats.

Q. 35. Did you ever harden the tip in any other way than by patting it with your hand while over the exhaust?

A. I have, by throwing off the exhaust when the side of the bat has been hardened sufficiently by the conical roller, as before mentioned, and placed it upon another solid cone, and placed
40 over it another cone or cover, and hardened the tip by means of shoving the outside cover against the bat.

Q. 36. In the Cowperthwaite process of hardening on the machine, was there any exhaust on the inside of the cone, after it had been removed from the machine, as stated in your last answer?

A. There was no exhaust.

Q. 37. Had you any difficulty in hardening the bat in the manner mentioned in your last answer?

A. I had none.

41 Q. 38. Have you ever made, or sent to the hatters, bats made by this process? and state what is the character as to market ability of such bats.

A. We have sent bats made by this machine to the hatters to be sized, but we never heard whether they were good or bad.

Q. 39. What complaint or objection was ever made to such bats when so sent?

(Objected to, as the question calls for hearsay testimony.)

A. There was no complaint or objection to my knowl-
42 edge.

Q. 40. As a practical hatter, what was your opinion as to those bats as compared with other bats?

A. My opinion is, the bats were the same as to variation in heft, from tip to brim, or any other point, as hats formed on the Burr or Cowperthwaite machine. The texture of the bats, when formed, was about the same as those formed on the Cowperthwaite machine.

Q. 41. Can you produce and make an exhibit of a bat formed on that machine, and hardened in the way you have
43 described?

A. I can produce one, but it has been handled so much that I don't think it would be as good as when first formed; by handling, it has made it breaky in the tip.

Bat produced, and marked Exhibit No. 2.

Q. 42. How does the mode of hardening the bat on this machine compare with that on the Cowperthwaite?

A. They are similar to each other; on the Cowperthwaite machine they are hardened by means of placing a cover over the cone and bat placed under a jigger and rollers, and hardened
44 in narrow spaces lengthwise of the cone and bat. In the Foskett machine the bat is hardened by means of a conical roller placed at the side, and hardened in narrow strips lengthwise of the cone and bat, while the cone and roller is revolving. The tip of the bat in the Foskett machine is hardened by means of patting with the palm of your hand upon the tip, or other ways, as before mentioned. The tip of the bat formed on the Cowperthwaite machine is hardened by means of placing the palm of your hand against the tip of the cone or cover, and shoved up and
45 down until sufficiently hardened.

Q. 43. Have you ever sized bats formed on this machine; and if so, with what result?

A. I have sized one bat formed on the Foskett machine; I think it was the first or second hat formed on the machine used in Cowperthwaite's shop; it made a very good hat for the kind of fur that it was made of.

Q. 44. Could you identify a model of the machine which you have referred to?

A. I could.

Q. 45. Please examine the model now shown you, and
46 marked Ex. No. 3, and state whether the same corresponds or differs from the machine to which you have referred, and wherein.

A. I believe it is the same with the exception of a spring that holds down the metal plate to the feeding-cloth; in the large machine there is a spring each side of the metal plate to hold it down to the feeding-cloth, while the string is snapping off the fur; the springs are about where the letter "A" is placed on the
47 model.

Cross-examined by Counsel for Complainant.

X Q. 46. In the Cowperthwaite machine is not the tip of the bat partly hardened by the outer cone when under the operation of the jigging rollers?

A. I should think it was hardened a little.

X Q. 47. Does it not receive all the hardening that is imparted to it, before it is removed from the cone, by the action of the outer cone?

48 A. It receives all the hardening imparted to it by the action or the rubbing of the outside cone on to the bat while under the jigger, and the rubbing of the outside cover and the bat on to the inside cone when the exhaust is off.

X Q. 48. Question repeated.

A. The answer will be given as in the first place; that is an answer to the question given.

X Q. 49. Is there any motion imparted for the hardening process in the Cowperthwaite machine given by the machine
49 itself, or by hand, other than to the outer cone?

A. I think there is no other, with the exception of one; in the last process, when the bat is being hardened by the boy on the machine, when the exhaust is off, causing the bat to adhere to the outside cover, and is hardened on the inside of the bat, instead of on the outside, as when under the jigger motion.

X Q. 50. What causes the bat to adhere to the outer cover when the boy operates the outer cover?

A. I should say that the cause was by the exhaust being
50 shut off; there was air blowing into the inside of the cone, and the outside cover being larger than the inside cone, and only hitting in narrow sections on the top, the natural consequence would be that when it became felted it would adhere to the outside cone or cover.

X Q. 51. When air was blown into the cone did it, or not, force the bat in contact with the entire inner surface of the tip of the outer cone?

51 A. I should say when the bat become thoroughly felted, the tip of the bat would adhere to the full surface of the tip of the inside of the outer cone.

X Q. 52. When under the jigging-rollers in the Cowperthwaite machine, about what portion of the circumference of the bat was acted upon by the outer cone?

A. I don't know as I could say exactly the proportion; it was in narrow sections, I could not say how wide, and lengthwise of the cone.

X Q. 53. Was it a third, a quarter, or an eighth, or
52 what other proportion, as near as your judgment can suggest?

A. It might have been a quarter or an eighth, more or less; I could not say positively.

X Q. 54. Was it not a section wider than the distance between the axis of the two jigging rollers?

A. It might have been a little, or not; I never observed close enough so that I could tell.

X Q. 55. How happens it that your observation has been less close of this part of the machine than on the other parts?

53 A. I would ask what parts you refer to?

X Q. 56. I mean all the other parts about which you have testified on your examination in chief.

A. All the other parts I have testified to; I have testified to as near as I could to what the machine was, and how it was constructed, and any question that is asked me concerning these parts that I have testified to, I will answer as correctly as I can; I have

testified to a good many parts of the machine and machinery; for that reason I cannot tell what part of the machine the gen-
54 tleman alludes to.

X Q. 57. Were your observations of the other parts of the machine to which you have testified, no more particular than your observation of that part of the machine which relates to the construction and action of the jigging-rollers and outer cone?

A. My observation might have been greater in some parts, and it might not have been as great in other parts of the machine.

X Q. 58. As near as you can remember, how much
55 larger in diameter was the outer cone than the inner cone at the bsae?

A. I should say that the outer cone or cover was from two to three inches larger at the base than the inner cone; some might have been a little more and some a little less.

X Q. 59. About how wide a streak or section was acted upon by the conical roller in the Fosket machine, which you saw at Cowperthwaite's, in hardening the bat?

A. I should say, as near as I could tell, it might have been two or three inches, more or less. Being that the conical
56 roller was not entirely stationary, I could not tell precisely, and even if it had been stationary I could not tell precisely by merely looking on and working the machine.

X Q. 60. Do you not know that the cylindrical surface of the roller used in that machine could not bear even upon a half an inch in width of the outer surface of cone?

A. I would ask the gentleman the meaning of the wo:d cylindrical.

X Q. 61. Substitute the word conical for cylindrical, as there is but one roller for hardening in the Fosket machine, to
57 which you have testified, and my question could not therefore have referred to any other roller.

A. I could not testify to that but what it would be more than that, as the roller was not stationary entirely.

X Q. 62. Does the movement of the roller enable it to bear upon a wider section of the cone at any one time than when stationary?

A. I am not expert enough to testify as to that.

X Q. 63. When hardening the bat upon the Fosket ma-
58 chine, by means of the conical roller, was that operation performed after the bat was formed, or during the formation of the bat?

A. It was during the formation and after the formation both.

X Q. 64. Do you mean by your last answer, that it was during the formation of the bat and continued after, or that in some instances it was hardened during the formation, and in some other instances hardened entirely after the formation?

59 A. I mean by the last answer that it was always hardened during the formation, and when the tip was hardened on the cone, when the exhaust was on by means of patting the palm of your hand upon the tip of the cone and bat, which was always after the bat was formed, and during that process the conical rollers were hardening the side of the bat; and if the tip of the bat was not hardened on the cone, when the exhaust was on, if taken off and hardened on a separate cone when the exhaust was off, the rollers were left on against the side of the hat, long
60 enough, after the bat was formed, for it to be sufficiently felted.

X Q. 65. How many revolutions about did the cone make in the said Fosket machine during the forming of one bat?

A. I could not say; I never took no observation as to that, as I know of now.

X Q. 66. Did it make as many as six?

A. I should think it did.

X Q. 67. Assuming that it did make six revolutions, did not then the conical roller harden, in succession, six several
61 thicknesses of the bat?

A. I would assume, then, that it might in that case.

X Q. 68. In the mode of hardening in the Cowperthwaite machine does the outer cone harden each successive layer, or the entire bat when completed?

A. It hardens the bat after it has been formed.

X Q. 69. In the Fosket machine when you harden the tip with the exhaust on, was not the bat held in contact with the tip of the inner cone by the pressure of the air?

A. I should think that the tip of the bat was held to the
62 outside of the cone or tip by the suction or draft below.

X Q. 70. You have testified that in the Cowperthwaite machine, when finishing the hardening of the tip before removing it from the cones, the air forced in the cone makes the tip of the bat adhere to the tip of the outer cone; and you have testified also that when hardening the tip with the exhaust on, in the Fosket machine, the tip of the bat is held to the tip of the inner cone. Do you consider that in both cases the tip is hardened in substantially the same way?

63 A. I believe that I testified that when the boy was hardening in the last process on the Cowperthwaite machine, the air did blow into the inside of the cone, and when the bat became felted or hardened, it did adhere to the inside of the outer cone or cover; and on the Fosket machine I believe I testified that I believed the suction under the cone held the tip of the bat to the tip of the cone, the one process of hardening on the Fosket machine. I did not testify that the tip of the bat was held to the tip

of the cone, in all cases of hardening the tip of hats formed
64 by the Fosket machine; I think that I said that I thought the principle of hardening was the same in the Fosket machine as on the Cowperthwaite machine, and I told the difference in the hardening process as near as I could.

X Q. 71. Assuming the tip of the hat in the Cowperthwaite machine not to be hardened when the bat is taken around to where the boy operates the outer cone, and a blast of air to be blown into the inner cone, and the outer cone to be larger than the inner cone, and larger than the bat, will the tip of the bat remain in
65 contact with the inner cone or the outer cone?

A. In the first place, I think that I testified that the tip of the bat was hardened a little while under the jigging operation, and when passed around to the boy the suction was shut off, and a little air blown into the inside of the cone, and when the bat was sufficiently hardened would adhere to the outside cone or cover, and not till then; that I consider a sufficient answer to the question; I do not know of any assumptions to make upon this
66 point.

(Answer objected to, as not being responsive to the question.)

X Q. 72. Question repeated.

A. I do not know of any assumptions to be made upon this point.

X Q. 73. Question again repeated, and witness is requested to consider whether it is not in his power to give an answer to the question.

(Objected to, because it implies that the witness has de-
67 clined to answer the question, which he has not.)

A. I consider that for an expert to answer, and will ask the gentleman if he considers me as such?

X Q. 74. When the boy is operating the outer cone for the purpose of hardening the tip of the bat, is the entire inner surface of the tip of the bat in contact with the tip of the inner cone, or is the entire outer surface of the tip of the bat in contact with the inner surface of the tip of the outer cone?

A. When the bat is sufficiently felted it is in contact with
68 the entire inner surface of the outside cone or cover; furthermore I cannot testify on that particular point; when the outside cover is taken off by the boy, it is then adhered to the inside of the outer cone; I have never taken an inside view of that cone when in operation, to see whether it adhered to the entire surface before felted; I know that if it is not sufficiently felted, it will not adhere to the entire surface of the inside of the outer cone.

X Q. 75. In working the Fosket machine was not the bat in contact with the tip of the cone, when hardening without
69 the exhaust?

A. When we hardened bats formed by the Fosket machine, with the exhaust off, we put an outside cover over the bat

and cone on which the bat was placed; and I should think that the outside cover or cone would hold the tip of the bat to the inside cone.

X Q. 76. Then you did not pat your hand directly on the bat, but on the outside cover?

A. When hardening hats with the exhaust off, formed by the Fosket machine, when they were placed upon the cone, we placed an outside cover or cone over then, and hardened them by
70 means of shoving the cover, similar to the way we did on the Cowperthwaite machine; I have before described the difference in the operation; when hardening the bat on the Fosket machine, with the exhaust on, we patted the tip with the palm of the hand, directly on the bat, and not on the outside cover, for we had no outside cover on in that case.

X Q. 77. In the Fosket operation, at Cowperthwaite's, how many of the hat bodies made on that machine were made up into hats?

71 A. I could not testify that there was one or not made into hats; I do not mean hat bodies by this answer.

X Q. 78. How many complete hat bodies were made by that machine; I mean how many hat bats were made on that machine, which were then made into good hat bodies?

A. I could not testify to the exact number; there were small numbers of bats or bodies formed at different times, and sent away with other bats or bodies to the sizing shop.

72 X Q. 79. What is the largest number to which you can testify?

A. I don't know that I could testify to a larger number than a dozen or eighteen being sent away at any one particular time; we never made a business of running the Fosket machine regularly from day to day; I could not testify to the particular number of the hat bodies or bats formed in Cowperthwaite's on the Fosket machine; as I have before said, there has been a dozen or eighteen, sometimes not more than three or four, or a half dozen, sent
73 away; they have been sent away in such numbers several different times.

X Q. 80. When sent away, were they sent separately, or with the hat bodies made on the other machines?

A. The bats or bodies were generally formed out of the same lot of stock as the other machines were forming on; these bats or bodies were done up in bundles of six dozen or thereabouts; and these bats or bodies formed by the Fosket machine were packed up in these bundles, and sent away with the same.

X Q. 81. When the hat-bodies made on the Fosket ma-
74 chine, at Cowperthwaite's, were packed up in bundles, with the hat-bodies made on the other machines, were they marked in any especial manner?

A. Not that I know of.

X Q. 82. What length of time did it require to complete the making of a body on the Fosket machine, including the forming and hardening?

A. I could not tell; I never tried to see what time it would require to form and harden the body.

X Q. 83. What became of that machine?

75 A. The Fosket machine that stood in George Cowperthwaite's factory, at Danbury, is now in a factory in Duane street.

X Q. 84. When was it taken down in the factory at Danbury?

A. I could not tell exactly to a day, but I should think about three weeks ago.

X Q. 85. When was it first put up in Cowperthwaite's establishment at Danbury?

A. I could not tell that exactly to a day, but I should think it was put up in Cowperthwaite's factory about the 1st of Jan-
76 uary, 1857.

X Q. 86. Was it not taken down till about the time it was removed to New York?

A. It was taken down, as I said before, about three weeks ago—I should think that was the time— and not till then; it might have been more than three weeks, or less than three weeks, I cannot say.

X Q. 87. Can you give the name of the establishment, or the number, in Duane street, to which it was taken?

77 A. The number, I think, is 83; I cannot give the name of the establishment.

X Q. 88. As you only worked for Cowperthwaite till the month of April, 1857, how do you know that it was not taken down till about three weeks ago?

A. I have been into the factory several times since the 1st of April, and the machine always stood there in the same position as it was last April when I worked there, until about three
78 weeks ago; I see it taken down, and it was put aboard the cars, and the next place that I see it, it was up in Duane street.

X Q. 89. Was that machine worked at any time after you left Cowperthwaite's employ in April last?

A. I think it was not.

X Q. 90. Was it worked regularly from the month of January till the month of April, 1857?

A. It was not worked regularly; it was worked from time to time when Mr. Cowperthwaite was there himself.

X Q. 91. For how long a time was it worked regularly?

79 A. It was never worked regularly from day to day; it

was only worked a few hours at a time when Mr. Cowperthwaite was there himself to help work it.

X Q. 92. About how many hours in all was that machine worked from January to April, 1857?

A. I could not tell.

X Q. 93. Were not the other machines worked regularly from January to April?

A. Some of them was.

X Q. 94. Will you name the hatters to whom the bodies
80 were sent that were made on this Fosket machine?

A. I think they were principally sent to Crofut, Bates and Wildman's, if not the whole of them; there might have some been sent to other places, I cannot say.

X Q. 95. Were the bodies made on that Fosket machine, after they were taken off the cone, steamed and further hardened in the same manner as the other bats made at Cowperthwaite's?

A. They were not steamed; they were folded up in a cloth and hardened as in hardening hand-made *hats*.

X Q. 95. Why were they not steamed and hardened in the
81 same manner as the bats made on the other machines?

A. I cannot tell why; I hardened them as my orders were to harden them.

X Q. 97. Did you harden all the bats that were made on that machine, or attempted to be made?

A. I did not harden them all, but I hardened the principal part.

X Q. 98. Who hardened the others that you did not harden?

A. Mr. Cowperthwaite hardened them himself.

82 X Q. 99. Don't you know that Cowperthwaite is not a hatter?

A. I expect he is not.

X Q. 100. What makes you suspect that he is not?

A. He never has told me that he was; I think that I asked him once, and he told me that he was not, I think, but that he had run hat-forming machines a considerable time.

X Q. 101. Was there no other hardener in the establishment but yourself and Cowperthwaite?

83 A. There was while I worked there.

X Q. 102. Can you tell why it is that none of the bodies made on the Fosket machine were hardened by any one except you and Cowperthwaite?

A. I do not know, unless it was that the machine was not run but a very little while another hardener was there.

X Q. 103. Why was not the Fosket machine run regularly like the others?

A. I do not know, only we never had orders to run it
84 only when Mr. Cowperthwaite was there himself.

X Q. 104. Do you not know that Cowperthwaite was

stopped by the process of the court, about the 15th of April last, from running the other machines?

A. I did not. I worked there till the 1st of April, and then he told me he should not run any longer. At present, since that time, I have been in other business. He never said he wanted me again, and I never asked him any questions about it.

85 X Q. 105. What proportion of the bats which were made or attempted to be made on the Fosket machine were made into good hat bodies?

A. I could not tell exactly; but the principal part, about the same as on the Cowperthwaite machine.

X Q. 106. About what proportion of the bats made on the Cowperthwaite machine, or attempted to be made, were actually made into good hat bodies?

A. I could not tell.

X Q. 107. Can't you form some estimate of the proportion?

86 A. When the weather was so that we could keep fire enough to keep the room warm, they were pretty much all passable hats—now and then a poor one.

X Q. 108. Have you ever known the Fosket machine to make from 10 to 18 dozen hat bodies in one day, or that number of bats that could be made into hat bodies?

A. I never see the Fosket machine run a whole day.

X Q. 109. Have you ever known it to make hat bodies in that proportion for any one hour?

87 A. I never timed the machine.

X Q. 110. When the bodies were taken off the metallic cone or cone-frame of the Fosket machine, was not the grass-cloth covering of the cone taken off with the bat?

A. It was; and I think I have stated so before.

X Q. 111. Was not the after hardening of the bat done on that grass cloth as an inlayer?

A. The grass cloth was not taken out until we had folded up in the cloth once and hardened it a very little; and then it was taken out, and the bat was finished hardening.

88 X Q. 112. Did you ever, in working the Fosket machine, see the attempt made to take the bat off the cone without taking the grass cloth with it?

A. I never have seen the bat taken off of the cone in the chamber unless the grass cloth was taken off with it.

X Q. 113. Will you give the name of the other hardener or hardeners that worked in Cowperthwaite's establishment from the time that the Fosket machine was first put up until you left there?

89 A. I think that Mr. Bidwell worked there a few days; not but a few days, I believe.

X Q. 114. Give the names of all the persons who worked in

that establishment, in any capacity, from the time the Fosket machine was first put up to the time you left.

A. Mr. Bidwell worked there a few days as hardener. Mr. Joseph Robinson worked there; he tended cone and to the business of the shop, principally when Mr. Cowperthwaite was not there. George Raymond worked there as cone-tender, and other business sometimes, around the shop. Mr. Cole worked there, (I
90 think his first name is Hiram J., won't be certain;) he tended fur-blowers. There were boys working there; I can't think of all of their names. I will mention what I can remember. There was one boy by the name of Davis; he was hardener on the machine. There was another boy by the name of Thom; he was hardener on the machine. There was another boy by the name of Dusenbury; he sometimes hardened, sometimes fed the fur on to the machine. There was another boy by the name of Byers; he sometimes fed fur on to the machine, and some-
91 times helped tend the fur-blowers. There was another boy, I think, worked there part of the time, by the name of Flagler, that used to harden on the machine. Some of these boys might have worked there the whole of the time. The Fosket machine was up until the time we stopped running; but I could not tell which, or how many of them. Mr. Cole that I spoke of as fur-blower, did not work there but a few days after the Fosket machine was put up. Mr. Robinson worked there the whole of the time after the machine was put up until we stopped running the machines.

92 X Q. 115. In which of the two modes described by you, as practised in connection with the Fosket machine, was Ex. No. 2 hardened?

A. The sides of the bat and brim were hardened by the means of the conical roller which I have mentioned before, while the bat was forming, and after it was formed, while I was hardening the tip with the palm of my hand, by patting on the tip of the bat and cone while the suction was on.

X Q. 116. Was not Ex. No. 2 further hardened after it
93 was hardened as specified in your last answer, and after it was removed from the cone-frame?

A. It was further hardened by means of folding it up in a damp cloth, and hardening, as described in the hand-made process.

X Q. 117. Where was Exhibit No. 2 made; in Danbury or in New York?

A. It was made in New York.

X Q. 118. When?

A. I think it was last Monday or Tuesday.

94 X Q. 119. How long did it take to make Exhibit No. 2, from the time the fur was first commenced to be put on

to the feed-table of the machine until the bat was taken off the cone-frame?

A. I could not tell; I did not time it.

X Q. 120. About how long did it take?

A. I could not tell. It might have been five or ten minutes, or more. I could not say. I should think no more, though it might have been less, than ten minutes.

X Q. 121. On that occasion, was Exhibit No. 2 made the
95 first trial of the machine?

A. I went into the shop and started the machine, and Exhibit No. 2 was the first hat that I tried, and the only one that I tried to form on the machine since it was put up in New York.

X Q. 122. Does Exhibit No. 2 contain all the fur which you fed on to the apron of the machine for the purpose of making it?

A. I think, of course, there was a little wasted, as there
96 is a little waste by forming hat bodies on most any machine that I ever saw.

X Q. 123. Did you weigh the fur which you put on to the apron on that occasion, and weigh the body afterwards, to ascertain the difference in the weight of the two?

A. I did not.

X Q. 124. Did any one else attempt to make a body on that machine after you made Ex. No. 2?

A. Not to my knowledge. I have not been in that shop
97 but once since that time.

X Q. 125. Do you know if the relative thickness of the brim and tip of the hat body can be varied on the Fosket machine; and if so, how?

A. I think it can, by the means of letting in smaller or greater quantities of air at the sides or bottom of the chamber.

X Q 126. Have you ever seen that tried?

A. I have seen hats formed when there was less tip sometimes than at others. I think it was varied in the way that I
98 have spoken of, but I am not expert enough to tell with certainty whether it is or not.

X Q. 127. Question repeated.

A. No other way than in the way I have spoken of. I never tried the machine as to that point myself.

X Q. 128. Do you know anything about it of your own knowledge? If so, state how it was done.

A. I would ask the gentleman about what.

X Q. 129. Will you swear that you did not understand what my last question referred to?

99 A. I did ask the gentleman what it did refer to, and I still ask the same.

X Q. 130. Question repeated.

A. I do understand that his last question before this does ask me if I will swear that I did not know what the one before referred to.

X Q. 131. Then, why did you not answer the question, and say whether you did or did not understand what my previous question referred to?

A. Because I did not think the previous question pro-
100 perly asked.

X Q. 132. What was the impropriety in the question referred to in your last answer?

A. I think the gentleman should relate or ask on some particular point that I had seen tried, or the whole machine. I wish to know.

X Q. 133. Do you know, of your own knowledge, if on the Fosket machine, as tried or worked at Cowperthwaite's, there was any mode of varying the relative thickness of brim and tip
101 of the bat? and if so, state what such mode was.

A. I never tried to vary the thickness from tip to brim myself. I have seen bats formed on that machine with scarcely any tip, but I never tried to vary it in thickness myself. Mr. Cowperthwaite did alter the machine or fix the same when there was any altering or fixing needed.

(Answer objected to as not being responsive to the question.)

X Q. 134. Question repeated.

102 A. I know that it was varied by some means, but I cannot state how any nearer than I have done.

X Q. 135. How do you know that it was varied by some means?

A. For this reason: there was bats formed on the machine with scarcely any tip, and when the machine was altered by Mr. Cowperthwaite the tip was formed thicker than before.

X Q. 136. Did you see him alter it?

A. I see him to work around the machine, fixing it in some way. I think that he let in more air on the bottom, at the
103 side; but I could not swear that he did, for I did not stand by and look on and see it done.

(All of the last answer, as to the conjectures of the witness, objected to, as not competent and not responsive to the question.)

X Q. 137. In that part of your examination in chief, in which you testified that the mode of hardening bats by hand, for hat bodies, which was substantially the same as what you call the Burr mode of hardening, did you mean to be understood that such hardening of a bat was performed on a cone?

104 A. I do not mean that the hats formed by the Burr machine are hardened on a cone; nor do I mean that the hats formed by hand are hardened on a cone.

X Q. 138. Have you ever read the patents under which the present suit is brought, granted originally to Henry A. Wells, and reissued to St. John and others?

A. I have merely read over the patent; or, in other words, I have read it.

X Q. 139. Do you understand the construction and mode
105 of operating the machine described in such patent?

A. I never have seen one of the old original Wells machines in operation; I have seen the Burr (so called) machine in operation a good many times; but I have never operated one of them.

(Answer objected to, as not responsive.)

X Q. 140. Question repeated.

A. I do not understand the mode of operating the old original Wells machine; nor do I understand the mode of operation of the Burr (so called) machine, only by sight, and as described
106 in the patent.

X Q. 141. Look at model Exhibit B, J. W. N., and state whether the trunk represented in that model is like the trunk of the machines which you have seen in use, and which you have referred to in your testimony as the Burr machine.

A. I should say, as far as I can judge from what I have seen, that it is very near, if not quite the same.

107 X Q. 142. State whether you have ever seen a machine in operation, anywhere, with a hinged hood on the upper end of the delivery aperture of the trunk, such as represented in model Exhibit E, and operated either by hand or by the machine.

A. I have never seen one to my knowledge.

X Q. 143. You have stated that when the bats are removed from the cone, when working on the Burr plan, that they are not felted; do not the fibres, of which said bats are composed, hold together sufficiently to admit of taking the bat off the cone, to be
108 subjected to the after process of felting?

A. They do, after they are wet, if felted while wet.

X Q. 144. Is not the usual practice, both in working on the Cowperthwaite and on the Burr plans, as you call them, to felt the bats in a short time after they are removed from the cones?

A. The usual plan is to do so; but they are not always done so.

X Q. 145. In what establishment is the practice different
109 from that called for in the last question?

A. In the Cowperthwaite establishment the hats were left over night, and over Sunday very often, after being taken off the machine, before felting by hand; and I think it is the case in other hat-forming establishments; the man hardening does not always keep up with the machine.

(The last branch of the answer objected to as incompetent, it being based on conjecture, while the question called for knowledge.)

X Q. 146. Can you swear of your own knowledge, that
110 when a fur hat is immersed in hot water the fibres are not thereby interlocked in any degree?

A. I do say, as far as I am a judge of working fur in warm water, it does not felt fur, but merely mats its together.

X Q. 147. Did you mean to be understood, when you testified that at Cowperthwaite's a larger number of bats were made on the machine after the steam-chest was removed from the forming room than when it was in the forming room, that the presence of steam in the room impeded or obstructed the forming of the bats
111 or the hardening of them on the cone?

A. I did not mean that what steam there was escaped in the room impeded or helped harden or form the bodies of bats.

X Q. 148. Question repeated.

A. I will answer as before, that I did not mean that the steam-chest being in the room either impeded the progress of forming the bat, and hardening or helped form or harden the bat. I do mean that when the steam-chest was out of the room, we formed
112 more bodies or bats than when it was in the room.

X Q. 149. Do you mean that the increased number was due to the absence of steam in the room?

A. I mean that the increase was due to the steam-chest being out of the room—for this reason, that we did not have to stop the machine or machines to wait for the fire to burn so that we could raise steam.

X Q. 150. Question repeated.

A. I do not mean that it was to the absence of the steam particularly, but by the absence of the steam-chest, as before
113 mentioned.

X Q. 151. Was it due to the steam, or was it not?

A. I do not consider myself an expert in this case.

X Q. 152. Do you not know, as a hatter, that the presence of steam in the smallest quantity will enable fur to felt better than when thoroughly dry?

A. I never had no particular experience as to that, only when I was at Cowperthwaite's factory, and I did see no difference in the texture of the bat when hardened with the steam-chest in
114 the room, and when it was out. I know from experience that fur will work better in a hot room, and felt better than in a room with steam.

Direct Examination resumed.

Q. 153. Please state how the temperature of the room, after the steam-chest was removed, compared with its temperature before.

A. The room was kept warmer by means of a cylinder stove, which burnt better than the other stove.

115 Q. 154. Were any other machines at Cowperthwaite's factory idle besides the Fosket machine, while it was at Cowperthwaite's factory?

A. There was.

Q. 155. How often and for what reason?

A. The biggest part of the time there was one machine idle, for the reason that part of the time we did not have hands enough to run it, and part of the time we did not have bodies to form sufficient to run it.

Q. 156. Was Mr. Cowperthwaite often absent during this
116 time; and if so, how often?

A. He was absent the biggest part of the time from the time the Fosket machine was put up till the 1st of April.

Q. 157. If the bats formed on the Burr machine are not felted while wet, what is the result?

(Objected to, as not responsive to any new matter called out by the cross-examination, and for the further reason that the same question, in substance, was put and answered in the first
117 examination of the witness in chief.)

Q. 158. Question 143 and answer is read to the witness, and he is asked why he so answered.

A. For this reason—that a hat formed and dipped into warm water, without felting in some way beforehand, could not be handled when dry enough, or sufficient to be felted.

Q. 159. How do you know this?

A. From what experience I have had in working fur in and out of warm water.

118 *Cross-examination resumed.*

X Q. 160. Were none of the machines worked at Cowperthwaite's during his absence?

A. There was some of them worked.

DAVID R. BROWN.

Subscribed and sworn to before me, this 9th day of October, 1857.

119 KENNETH G. WHITE,
U. S. Com'r.

Adjourned to the 10th, at 10 a. m.

October 10th.—Present, the parties and their counsel.

1 UNITED STATES OF AMERICA,
Southern District of New York,
City, County, and State of New York, ss.

2 Be it remembered, that on this tenth day of October, in the year of our Lord one thousand eight hundred and fifty-seven, I, Kenneth G. White, a commissioner, duly appointed by the circuit court of the United States, for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress en-

titled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes
3 depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, No. 9 College Place, in the city of New York, in the said southern district of New York, in the State aforesaid, Andrew W. Putnam, to testify and the truth to say, on the part and behalf of the defendants, in a certain suit or matter of controversy, now de-
4 pending and undetermined, in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants.

And the said Andrew W. Putnam being about the age of 54 years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said Andrew W. Putnam, and he did thereupon depose, testify, and say
5 as follows, viz:

Q. 1. What is your name, age, residence, and occupation, and how long have you been in such occupation?

A. Andrew W. Putnam; 54 years; residence Newark, New Jersey; occupation a manufacturer of wool hats now. I have always been in the woollen manufacturing from 11 years of age; I have been engaged in woollen hat manufacturing over twenty-five years.

Q. 2. How long a time have you used or known pickers to be used in the woollen manufacture? Describe the general
6 construction of such as you have known.

A. I have known them as long as I have known woollen manufacturing; a common picker consists of an endless feed-apron, a pair of nipping-rollers for holding the wool to the pickers, a rapidly revolving picker wheel, having a cover over it, sometimes having a strip in front. Model Exhibit No. 4 fairly illustrates the machine. The wool is fed in on the apron, passes between the nipping-rollers, is caught by the pickers and separated into fibres, loose; air enters with the wool in front, passes around with
7 the revolution of the picker, and the wool is freed from the revolving picker, and carried away by the revolution of the picker and the current of air.

Q. 3. Suppose you wish to throw the wool after it is picked up or down, how did you accomplish it?

A. After the wool is picked it is done with, and lays on the floor. I understand the gentleman to inquire that he wants to ascertain how the machine is regulated to throw the wool up or down. So far as I know anything about it it is done by bringing this
8 circle, and also by taking this top off a little, the same as

it might be to reverse the piece marked "C," and point it tapering upwards; by this circle I mean the lower concave under the picker; we would incline the piece "C" upwards; that would blow the wool out a little further up.

Q. 4. In forming wool hat-bodies, what was the thickness of the bat at the brim and tip, relative to each other?

A. I don't know that I can answer that question. In
9 forming wool hats we lay our band and brim the heaviest; we regulate that according to the weight of our hats; we endeavor to throw as much on to the tip as answers our purpose, without having holes in the tips.

Q. 5. How did you accomplish this result, having the bat thicker at the brim than at the tip?

(Objected to, as the defendant, in his answer, has not indicated that there was anything known in the manufacture of wool-hats prior to the invention in the plaintiff's patents, involving
10 the principle of the invention at issue; or that the witness had any prior knowledge of the thing patented, or any substantial part thereof.)

A. We do that by the regulating of our web as it passes through the carding machine on to the cone; that cone is on a separate machine, called a forming machine; and we change and alter that by a vibratory motion, by shortening or lengthening the connecting-rod; that throws the cones of the forming machine further
11 in or further out, just as we want to place them.

Q. 6. Did you ever effect this result in any other way, or by means of the feed?

(Same objections, with the further objection that the question is leading.)

Q. 7. Did you effect this in any other way; and if so, how?

(Same objection as to question.)

A. We sometimes, in forming very small hats; we have a sliding piece on top of the feed-apron that we put up closer together
12 to make the web narrower, in order to suit the cone that we want to form the bodies on, in order that there should be no waste off the tips.

Cross-examined.

X Q. 8. In the wood-picking machine is there any other object in throwing the wool off the pickers than simply to get it on the floor beyond the picking-cylinder, so that it can be con-
13 veniently removed from there for further use?

A. I have never worked with any of them.

X Q. 9. Have you ever seen a wool-picker so constructed that it could be set or shifted at the will of the operator, so as to throw the wool higher or lower? and if so, how was it arranged to effect the change?

A. I never have seen any; not as a single picker; I never have seen any that could be shifted; not moved up and down at the will of the operator; they have all been stationary that I
14 have seen.

X Q. 10. Is not the concave always made of bars, with narrow open spaces between the bars?

A. Yes, sir.

X Q. 11. Is the wool thrown in any particular direction other than to throw it out?

A. No, sir; not as a common thing.

X Q. 12. If you know of any instance different from what is called for in the previous question, state when and where such machine was used.

15 A. I think there is one in Newark, at the hosiery company's, where they throw their wool on to a cylinder or large roller that is placed in front of the picker.

X Q. 13. When did you first see that?

A. About a year ago.

ANDREW W. PUTNAM.

Subscribed and sworn to before me, this 10th day of Oc-
16 tober, 1857.

KENNETH G. WHITE,
U. S. Com'r.

1 UNITED STATES OF AMERICA,
Southern District of New York,
City, County, and State of New York, ss.

2 Be it remembered, that on this tenth day of October, in the year of our Lord one thousand eight hundred and fifty-seven, I, Kenneth G. White, a commissioner, duly appointed by the circuit court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the
3 more convenient taking of affidavits and bail in civil causes depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, No. 9 College Place, in the city of New York, in the said southern district of New York, in the State aforesaid, William Fosket, to testify and the truth to say, on the part and behalf of the de-
4 fendants, in a certain suit or matter of controversy now depending and undetermined in the circuit court of the

United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants. And the said William Fosket being about the age of 44 years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said William Fosket, and he did thereupon depose, testify, and say as
5 follows, viz:

Q. 1. What is your name, age, residence, and occupation?

A. William Fosket; age forty-four years; residence Meriden, Connecticut; occupation, a machinist.

Q. 2. Have you made any inventions yourself, or given any attention to the inventions of others?

A. I have made several myself, and given much attention to those of others.

Q. 3. Did you ever invent and construct any hat-body
6 machine; and if so, when did you construct such machine?

A. I constructed such a machine in July, 1843.

Q. 4. Did you ever apply for a patent for such machine?

A. I did.

Q. 5. When?

A. In April, 1843.

Q. 6. What was the character and general size of the machine constructed in July, 1843? Mention its parts and describe the construction and arrangement.

7 A. It was a working, full-sized, practical machine. First, a hollow perforated porous cone, or former. This former rested on a rotating ring; beneath this ring was a trunk communicating with an exhaust fan. The cone stood near the bottom and in the centre of an enclosure or chamber, said chamber having long narrow openings at the bottom of the sides; on one side of the chamber was a door and window; near another side stood a frame supporting rolls and a feeding-apron. At the end of the frame nearest the chamber was a feed-roll, surmounted by a pressure, or pinching-plate, of metal. Near the point of con-
8 tact of the plate and the roll was stretched a cat-gut bow-string; this bow-string was operated by finger-wheels drawing the string and letting it strike near the point of contact of the plate and roll. A trunk passed from near the feed-roll, and partly around it, and communicating with the chamber containing the cone, or former. Against the side of the cone was placed a conical roll, held there by spring pressure; this roll received a short and rapid vibration lengthwise.

9 Q. 7. Describe the mode in which the bat was formed by this machine.

A. An even layer of fur was spread over the feeding-apron; the feeding-apron delivered it to the roll and plate; the roll, revolving towards the string, carried the fur beneath the pinching-plate, and presented it to the vibration of the string; the fur was carried by the string and current of air through the trunk into the chamber and deposited against the cone, thicker on that part of the cone presented to this current of air containing the fur than on
10 the opposite side. A portion of the fur was distributed around the cone, and in the chamber, depositing on all parts of the cone. The vibrating-roll was at work during the formation of the bat, and by the time it was completed the sides had received sufficient hardening to allow of the removal of the cone and bat without injuring the bat.

Q. 8. What kind of a cone did you use on that machine?

A. It was formed of thread knit in gores, and put together so as to make a conical form; it was stretched on to a wire
11 frame, and varnished with an alcoholic solution of shellac; this gave it sufficient stiffness to stand alone and be handled without injury.

Q. 9. What was the condition of the bat formed on such cone before you removed the cone and bat from the ring over the exhaust?

A. The bat was even in the direction of its circumference, but properly varied in thickness from brim to tip.

Q. 10. How were you enabled to remove the bat from the cone on which it had been formed?

12 A. The door at the side of the chamber was opened, the pressure roll removed from the side; the thread cone with the bat was easily lifted from the wire-frame and taken out of the chamber through the door. The cone with its bat was then placed on a block of the same shape with the inside of the cone; over the bat was spread a hardening cloth, so called by hatters. A hollow cone, open at the smaller end, was placed over the cloth and pressed upon it and upon the bat. This hollow cone received a rapid vibratory circular motion. This operation hardened
13 the sides of the bat still more, and the hollow cone slipped downward on the cloths by its weight as the fur hardened and reduced in thickness. When I thought the side sufficiently hardened, I removed the hollow cone, and placed my hand on the tip and rubbed the cloth in the hatters' method of hardening by hand. I then made a block with a concave surface, fitting to the tip of the bat, placed it in the smaller end of the hollow cone, so coupling it with the cone that it would receive its vibration, and allow the cone to slip downwards, as mentioned before. This block thus placed and worked, hardened the tip much better than
14 I could do it by hand. This cone and tip-block being removed, the cloth was taken off the bat, the lower edge was

turned upward, and lifted by its brim, thus freeing it from the cone to which it slightly adhered, leaving the bat inside out.

Q. 11. What was done with the thread former, after you removed the bat, as you have just described?

A. It was returned to the frame in the chamber.

Q. 12. What was done with the bats when they were re-
15 moved from the thread cone, as you have described?

A. They were folded, packed, and sent to the hatters' shop to be sized.

Q. 13. What was the character and texture of the bat as it was removed from the conical former?

A. The bat was even in the direction of its circumference, and properly proportioned in its length to suit the hatters. The texture was firm, so as not to be easily injured by proper handling; I mean properly proportioned in thickness or weight from brim to tip.

248 Q. 14. By what arrangement or action was the proportionate thickness attained while the bat was being formed on the forming cone?

A. The action of the draft of air, together with the delivery of the fur from the picker near the bottom of the chamber, tended to produce somewhat too great thickness proportionately at the brim, especially in the case of forming a very light bat. This tendency was counteracted by graduating or varying the amount of air let in at the bottom of the chamber rushing inward and upward, thus carrying a suitable portion of the fur on to the upper por-
249 tion and tip of the cone.

Q. 15. Did you ever see any bodies formed upon this machine, and which had been removed, as you have stated, and sent to be sized, after they had been sized; and if so, what was their character or condition?

A. I did see some of them. Their character, I believe, was good, and were of suitable strength and condition for blocking and finishing into hats.

Q. 16. Was this machine publicly run; and if so, for what purpose was this machine constructed or run?

250 A. It was publicly used and exhibited to many visitors, and was run for the purpose of manufacturing bats.

Q. 17. Have you seen a machine similar to your machine in the factory of George E. Cowperthwaite, at Danbury; and if so, how did that machine compare with your machine?

A. I have seen a similar machine in Cowperthwaite's factory, and it was substantially the same in its operative parts.

Q 18. Please examine model, Exhibit No. 3, and state
251 how it compares with your machine of 1843.

A. This model is substantially, and I think essentially,

the same with my machine, operated by me in July, 1843. There is an incidental difference, I perceive, in the part supporting the cone on which the bat was formed; in this model now before me the supporter of the cone is perforated sheet-metal, an article which I could not obtain at the time of building my machine, otherwise than by perforating it in a slow way, and at an expense which I could not afford; I much wanted such a sort of a supporter
252 for my cone, and talked with an associate, who suggested the thing to me about one; my cone-supporter, as I have mentioned heretofore, was made of wire wound around in the direction of the circumference with other wire; the two sets of wire being soldered together.

Q. 19. Was a patent granted on your application of 1843; and if so, when?

A. A patent was granted to me for my machine in January, 1846.

Q. 20. What were your means, pecuniarily, about the
253 time you completed this machine in 1843?

A. I was destitute of pecuniary means; was much in debt; I had mortgaged my share of one-fourth in the invention to obtain a small amount of money to pay up some expenses; about the time of using my machine, I think for the last time, I mortgaged my tools to obtain another small sum, that I might pay again what I had borrowed of one of those who lent me aid. I remember, also, that I wanted some clothing, and sold part of my books to obtain it.

254 Q. 21. Were any efforts made by you to introduce this machine into general use?

(Objected to, as the efforts of this party to introduce any machine is irrelevant to the issue.)

A. I made very earnest and persistent endeavors to have those who held the claim to the other three-fourths of the invention, or to that one of the number with whom it was left by the others to direct what should be done, and when; I mean that I tried to have him furnish me with the needful means of continuing to run the machine, and size the bodies, and thus fairly introduce them
255 into market.

Cross-examined.

X Q. 22. From the time you had the machine constructed in 1843, to which you have testified, for how long a time was it operated?

A. The machine which I constructed, and put in operation in July, 1843, I operated but very little for the purpose of
256 manufacturing; I experimented more with it, I think, with a view to further improvements; I am not able to state very nearly the time—probably less than one month.

X Q. 23. How long did you experiment with it?

A. I doubt whether the experimenting at that time, and the manufacturing of the few bats made at that time, occupied more time than I have stated.

X Q. 24. What time have you stated in your last an-
257 swer?

A. I think it was one month, or not exceeding one month.

X Q. 25. Have you not stated that you operated that machine for manufacturing less length of time than for experimenting?

A. If I have, I have not expressed what I intended to.

X Q. 26. Will you now state how long a time you operated that machine for experimenting, and how long you operated it for manufacturing purposes?

A. I think I did not experiment with it at the time more than three weeks, and did not manufacture enough bats suitable
258 for sale to require the use of the machine and attendant for even one day.

X Q. 27. How long was that machine in existence?

A. I am not able to say whether the machine be not still in existence, but the longest period I can recollect at this time of knowing it to be in existence was less, I think, than three years.

X Q. 28. When was that machine, to your knowledge, last put in operation to form hat bodies?

A. In July, 1843.

259 X Q. 29. Give the names and places of residence of every individual who connected with you in any manner, whether as furnishing capital, professing an interest in the invention, or giving you aid in any manner, in reference to the construction, experimenting upon or working that machine.

A. I will name them as well as I can remember at this time. Benjamin S. Stedman, residing in Meriden, Connecticut; William B. Surdam—if I recollect right his post office address, a few months since, I was informed is Mill Haven, Juncan county, Wisconsin;
260 Rufus Brown, Three Rivers, Massachusetts; Edmund H. Hancock, (if I rightly remember his name, as we always called him Henry Hancock,) his residence I do not now know; Ansel Phelps, I think, of Springfield, Massachusetts; Joseph A. Brown, Three Rivers, Massachusetts, as I suppose; Henry Lyon, deceased, did reside in Ware. I don't know that I can call to mind any others at this time.

X Q. 30. Were all these persons connected with this matter at the same time?

261 A. They were not.

X Q. 31. Over what length of time did the connection with it extend?

A. They varied from only a few weeks, as I think—in one case, others somewhat longer; and one, who held an interest in the invention and machine until, I think, December, of the past year. This one, however, more than once received and conveyed his interest in the years 1842 and 1843. He also, as I believe, obtained his last interest, or possession of interest, about the time of
262 the issue of the patent.

X Q. 32. What was his name?

A. Rufus Brown.

X Q. 33. Did he possess an interest during any portion of the time that the machine was operated, either for experiment or for use?

A. If I remember rightly, he held an interest in it during a portion of the time occupied with the earlier experiments.

X Q. 34. During what portion of the time that the ma-
263 chine was used for experiments did he possess such interest?

A. I cannot recollect with certainty.

X Q. 35. Was it one, two, or three weeks?

A. I think it was more than one, and probably as much as three.

X 36. Was it more than three?

A. I am not able to remember.

X Q. 37. To whom did Rufus Brown assign his interest about last December, and at whose request?

264 A. I had never assigned away any portion of my interest, as I recollect, but had signed agreement to assign three-fourths of the interest in case the patent should be granted, and at such time as any party or parties holding rightful claim to the whole, or any part of said three-fourths share. In or about December last, I received written instruction from Rufus Brown to assign such share as belonged to him, purporting to be three-fourths of the right of the patent. I can't say that he assigned it away, as I don't know that he did assign it away; I don't
265 know at whose request.

X Q. 38. Have you any interest in that patent at present, directly or indirectly?

A. I believe I have no direct interest in the same, and scarcely understand whether I have an indirect interest.

X Q. 39. Do you not expect to be remunerated by parties against whom a suit is pending, and brought by the owners of the reissues of the Wells patent, if they should succeed in making your patent available in such suit?

266 A. I do not recollect any promise of such remuneration, and I know not why I should expect any such reward.

X Q. 40. Have you not received such promise from Elbridge Brown of Massachusetts?

A. Not to my present knowledge or recollection, and believe that I have received no such promise.

X Q. 41. Did you not write to Rufus Brown that you had received such promise from Elbridge Brown, and that if you received such remuneration you would pay him (Rufus Brown) three-fourths of it?

267 (Objected to.)

A. I recollect of writing to Rufus Brown, asking him if he would convey or resign to me his share or right in the invention, saying, that if he would do so, and I could obtain anything for the same, I would pay to him three-fourths of what I could thus obtain. This is my present best recollection of that correspondence.

X Q. 42. Did you transmit to him a written paper making such transfer, and request him to sign it?

A. I admit that I did.

268 X Q. 43. A letter being shown to the witness, marked Exhibit F, he is asked if it is in his handwriting.

A. I recollect of writing a paper similar to this, and I dispute not nor question this to be the identical one.

X Q. 44. And paper marked Exhibit "G" being shown witness, he is asked whether that is the paper referred to in the letter marked Exhibit F.

A. I am not able to identify said paper.

X Q. 45. Is the paper marked Exhibit "G" of the same purport as the paper which you did enclose to Rufus Brown, in the letter marked Exhibit "F?"

269 A. I think it is.

X Q. 46. How many hat bodies, in all, were made in the machine to which you have testified, which were afterwards made up into good hats, to your knowledge, and by whom were such hats made?

A. The machine to which I referred had been used, at least many of its parts, (previous to the time to which I alluded as having constructed my machine, and used it in the manner I described,) during a part of the fall and winter previous, in experimenting and making bats or bodies; during the whole of

270 this time we made, I should think, nearly or quite four dozen shells for silk hats, and two dozen of fine bodies, of a better character, for brush and napped hats. I am not able to state the numbers with anything like precision, but believe I have placed it quite low. The number of these good bodies occasionally made during my series of experiments, which were finished, to my knowledge, into hats ready to be worn, was very few. I would not say positively that it exceeded a half dozen, but I think it did.

271 X Q. 47. When was Rufus Brown last connected with the working of the machine?

A. I have no means of determining precisely, but think it was in November, 1842.

X Q. 48. When did he last see the machine to which you have testified?

A. I do not remember.

X Q. 49. Was not Rufus Brown familiar with the use of that machine during the whole time that it was used, either for experiment or for manufacturing?

272 A. I think he was not the whole time, for he was, I think, out of town during the last month of its use.

X Q. 50. Was he not interested in the invention during the last month of its use?

A. I am not able to say.

X Q. 51. Did he see the machine after his return from the absence to which you have referred?

A. I presume he did, but do not recollect certain.

X Q. 52. Did you apply to him for further assistance, or
273 for means to manufacture with that machine after his return?

A. I wish to say that I don't remember that he returned to Ware to reside at all; and I do not recollect whether I made any such application.

X Q. 53. You know that he had an interest in it after you stopped working that machine, did you not?

A. I remember I was told that he had purchased a portion of the right to a share of the invention, but cannot now remember that I had any further information of this transaction.

274 X Q. 54. When did you learn that he had the three-fourths interest in the invention, referred to in your letter Exhibit F?

A. As well as I can recollect, the first I was informed of it was about the last of August, 1846.

X Q. 55. Did you not know that he had such interest before the patent was granted?

A. The interest which I understand he held at and after August, 1846, I believe was three-fourths share; and I don't recollect to have ever known of his holding so great a share previous to
275 that time.

X Q. 56. Did not you know that he held some share before the patent was taken out?

A. I did know that I had promised him a portion of the right to that invention during the first few days of my work, preparatory to building and experimenting with such kind of machinery.

X Q. 57. What improvement, if any, did you make on that machine after it was constructed in July, 1843?

A. I cannot now think of any important improvement
276 made in the machine after July of that year; in June or July I constructed the machine substantially as represented in the model present, having the proper proportioned openings around the bottom of the box, without openings at the upper portion of the box, as I had sometimes previously done; thus obtaining by that means a more satisfactory distribution of the fur than I had done in previous operations.

X Q. 58. What induced you to let your application lay for so long a time in the Patent Office, without efforts to have the patent granted?

277 A. I had no means that I could well spare to defray expenses; and besides, I had left that part of the business to be attended to by Henry Lyon, Ansel Phelps, and Joseph A. Brown, who each held an interest in the machine; and, as I believed, either of them was able to do it alone.

X Q. 59. Had you not paid the fee in the Patent Office in 1843, and transmitted your papers and model?

A. I supposed the fee was paid in, and other parts of the business was transacted; but I did not furnish any money my-
278 self, out of my own pocket, for that purpose; for the good reason that at that time I was not rich enough to invest so much capital.

X Q. 60. Did you not know that R. H. Eddy, of Boston, had been employed as agent to transact this business at the Patent Office for you?

A. I was aware that he had.

X Q. 61. The expense having been incurred in making the application, and employing an agent, how could the want of means have been the inducing cause of letting the application re-
279 main so long a time in the Patent Office?

A. I suppose that time and money must have been required to complete what was needed to be done, and I could not well spare either, still hoping that those whose duty and interest as I supposed it was would attend to that matter.

X Q. 62. Did you not know that the Patent Office had not refused to grant a patent on your application?

A. I think I did not have any certain knowledge of such a supposed fact.

280 X Q. 63. Did you not try to find out what had been done with your application?

A. I do not recollect, but I do remember some one told me that the claim which I desired to make was too broad, and that it could not be granted.

X Q. 64. What induced you to urge your application before the Patent Office in December, 1845?

A. I am not aware that I did so, but suppose Joseph A. Brown,

who was then, as I think, residing at Boston, while I was residing at Meriden, at the same time, was making exertions to ob-
281 tain the issue of the patent.

X Q. 65. When did Joseph A. Brown acquire his interest?

A. I do not know.

X Q. 66. From whom did he acquire it?

A. I do not know, but I believe that he acquired it of his brother Rufus, and that in the spring of 1843.

X Q. 67. Do you not know that he acquired that interest, or some interest in that invention, in the fall of 1845?

A. I have no recollection of having known such to be
282 the fact.

X Q. 68. Do you not know that he was induced to make efforts to have the patent granted, or to incur the expense that might be required to have the patent granted, on the representations of either yourself or Stedman that there was a machine invented by Wells, in New York, in operation, that was successful in making hat bodies on an exhausted cone, or by representations to that effect?

A. I do not.

X Q. 69. Before your patent was granted, had you not
283 heard that there was such a machine in operation in New York?

A. I had, if my memory serves me right.

X Q. 70. Had not Stedman told you so, and that he had seen it?

A. I do not recollect any such information from Stedman.

X Q. 71. Did he not write to you to that effect?

A. I do not remember that he did.

X Q. 72. Did you not correspond with Joseph A. Brown
284 about the machines in New York, and that money could be obtained from the parties connected with it if a patent could be obtained?

(Objected to unless the correspondence be shown witness.)

A. I recollect to have corresponded with said Brown concerning my machine, and saying something about the New York machine, and the parties owning it, but do not recollect whether I wrote anything as to whether money could be obtained of them.

285 *Direct Examination resumed.*

Q. 73. Did you see Mr. Eddy, or any other person, about drawing your specification?

A. I think I never saw Mr. Eddy until the year 1854, and I do not recollect of seeing any one in the year 1843, or about that time, for the purpose of making any arrangements about my drawings.

286 *Cross-examination resumed.*

X Q. 74. Was not Ansel Phelps, to whom you have referred, a lawyer?

A. He was.

WILLIAM FOSKET.

Subscribed and sworn to before me this 10th day of Oct., 1857.

KENNETH G. WHITE,

287 *U. S. Com'r.*

Adjourned to the 13th, at 10 a. m.

UNITED STATES OF AMERICA,
Southern District of New York, City,
County, and State of New York, ss.

288 Be it remembered, that on this thirteenth day of October, in the year of our Lord one thousand eight hundred and fifty-seven, I, Kenneth G. White, a commissioner duly appointed by the circuit court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil
289 causes depending in the courts of the United States," passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, No. 9, College Place, in the city of New York, in the said southern district of New York, in the State aforesaid, Benjamin S. Stedman, to testify and the truth to say, on the part and behalf of the defendants, in a certain suit or matter of controversy,
290 now depending and undetermined, in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants.

And the said Benjamin S. Stedman being about the age of 41 years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said Benjamin S. Stedman, and he did thereupon depose, testify and
291 say as follows, viz:

Q. 1. What is your name, age, residence, and occupation?

A. Benjamin S. Stedman; 41 years; residence West Meriden, Connecticut; occupation, machinist.

Q. 2. Do you know William Fosket, and how long have you known him?

A. I know him, and since about 1841.

292 Q. 3. Have you any knowledge of his making application for a patent for a machine for making hat bodies; and if so, about what time?

A. I do; about 1843.

Q. 4. Have you any knowledge of his constructing and using any machine for making hat bodies, such as he applied for a patent for; and if so, when was said machine constructed?

A. I have a knowledge of his constructing and using a machine; that machine was built, I think, the same year that a patent

293 was granted.

Q. 5. How long after the patent was applied for was it issued?

A. I am not able to state the length of time precisely; I should think it was a year or more.

Q. 6. Did you own any interest in the invention of William Fosket; and if so, to whom did you transfer it?

A. I did own an interest in it, and I transferred it to Henry Lyon.

Q. 7. About what time?

294 A. That I don't recollect; some six to ten months, perhaps a year, after the patent was issued.

Q. 8. Please examine the assignment now shown to you, marked Exhibit No. 5, and state if that is the assignment made by you, and what date it bears.

A. This is the assignment, and is dated the 11th day of April, 1843.

Q. 9. When do you now think that you saw the machine of Fosket's constructed or used to which I referred in my pre-

295 vious question?

(Objected to, as the same question in substance has previously been put to the witness and answered by him.)

A. Some time in the year 1843.

Q. 10. Why do you think so?

A. It being the year previous to my leaving Ware.

Q. 11. When did you leave Ware?

A. In March, 1844.

Q. 12. What was the character of the machine which

296 you saw constructed or used by Fosket the year before you left Ware? Describe its parts and mode of operation.

A. As regards the character of the machine, it was a well constructed machine, and performed its work well. This machine was constructed with a platform or apron, on which the fur was laid and fed into the machine. It was picked with a string drawn on to a cone covered with a net-work. This cone was enclosed in

a square box. Beneath this box was a fan-blower used for drawing the fur on to the cone. The box had a regulating draft
297 or apertures in the bottom to govern the thickness of the bat. While the fur was depositing on the cone a small roller revolved on the side of the cone for the purpose of partially hardening.

Q. 13. What was the motion of this roller which revolved against the cone?

A. Its motion was revolving and vibrating motion, up and down.

Q. 14. What was the cone composed of on which the bat was formed?

298 A. It was composed of twine or thread net-work, sized or stiffened with shellac sizing—gum shellac.

Q. 15. After the bat was formed on this cone, what was next done to it in the process of Fosket, as seen by you before you left Ware?

A. It was hardened on a solid cone; the bat with the net-work was taken from the cone on which it was formed and placed on a solid cone; a shell was put over it the same shape of the cone; this shell was then moved partially round and back, or what
299 they called giving it a jiggering motion, while it pressed upon the bat; the bat was then removed from the net-work by drawing from the bottom up over the top—that is, taking hold of the bottom of the bat and turning it inside out.

Q. 16. What was done with the bats so made on that machine before you left Ware; what was their character, and how many were made?

A. They were sold, and left at stores and hatters' shops to be seen; some of them were finished up into hats to be worn; they were said to be good by hatters—better bodies than were
300 made by hand, and in my judgment were far better. I saw a number of dozen made; could not tell how many.

(So much of the above answer as begins with the words "they were said to be," and ends with the words "far better," objected to as hearsay testimony, plaintiff's counsel having cautioned the witness not to testify to what he heard from others after the words "they were said to be," and defendant's counsel instructing the witness to testify as to what he had heard.

Counsel for defendant denies that he instructed the wit-
301 ness to answer the question, but insisted that the witness should answer it in his own way; and the objection of plaintiff's counsel should be noted.

Plaintiff's counsel replies that the defendant's counsel, in the presence and hearing of the witness, contended with plaintiff's counsel that such hearsay testimony, as to the character of the bats,

was competent and proper, and then the witness completed his hearsay testimony above referred to.)

Q. 17. What was the character of those bats in your judg-
302 ment?

A. They were good.

Q. 18. Were any of them made up into hats?

(Objected to, as witness has already answered.)

A. They were.

Q. 19. What knowledge have you as to the character of the hats which said bats made?

A. I have worn hats made on that machine, and seen those that others have worn; the hats were good, and wore well.

303 Q. 20. Please examine the model, Exhibit No. 3, and state whether said model corresponds or differs from the machine of Fosket's as you saw it before you left Ware, and wherein it corresponds or differs from said machine.

A. I see no difference between this model and the machine, as near as a model and machine can correspond in their principles and construction.

Q. 21. Do you recollect on what the thread-cone, stiffened with shellac, rested or was supported by while the fur was being
304 deposited on it?

(Objected to, the same question in substance having already been put to the witness, and answered by him.)

A. I do recollect it rested on a cone made of wire.

Cross-examined.

X Q. 22. What was the extent of the interest which you acquired in the invention of Fosket to which you have testified?

305 A. It was either one-fourth or one-fifth.

X Q. 23. Was it no more than the proportion which you assigned to Henry Lyon?

A. It was no more; that was all.

X Q. 24 From whom did you acquire that interest, and what sum did you pay for it?

A. I acquired it from William Fosket; the sum paid was my time and money paid, stock used, shop rent, use of tools for
306 the purpose of building that machine, and others previous.

X Q. 25. At what sum did you estimate the value of all the items enumerated in your last answer?

A. They were never footed up; no estimate made.

X Q. 26. Did you keep any account of them during the progress of this matter?

A. There was an account kept of some of them.

X Q. 27. Can you now form any approximate idea of the value of them?

A. I don't think I could.

307 X Q. 28. What length of time was occupied in the construction and working of this machine, and those which preceded it in your shop?

A. I am not able to state the exact time.

X Q. 29. State as near as you can.

A. I don't think I could fix any time; it was spread over such a length of time at intervals for more than one year from time to time.

X Q. 30. Did you acquire your interest before or after the completion of the machine which you have stated was like
308 model Exhibit No. 3?

A. Before.

X Q. 31. How long before you transferred it to Lyon did you acquire such interest?

A. About that time; not far from that time; it might be a month, or three months.

X Q. 32. Was the machine completed after the assignment to Lyon or before?

A. I think it was after.

X Q. 33. How long after do you suppose?

309 A. I am hardly able to tell the time; pretty soon after, as soon as they could conveniently do it.

X Q. 34. Had any experiments been made on any machine prior to the assignment to Lyon?

A. There had.

X Q. 35. Were such experiments successful and satisfactory?

A. They were as far as tried.

X Q. 36. After your assignment to Lyon, did you ever possess any interest in the said invention, or have a promise of any
310 interest?

A. I did not.

X Q. 37. You have stated in your examination in chief that the box had regulating draft or apertures to regulate the thickness of the bat; how was such draft regulated?

A. By making the apertures larger or smaller.

X Q. 38. How were such apertures made larger or smaller?

A. I have seen it made larger by raising the box; also made smaller by pieces of boards.

X Q. 39. Is there any plan of adjusting such draft rep-
311 resented on the model Exhibit No. 3, which you have sworn is a correct representation of said machine?

A. I see no plan on this model for doing it.

X Q. 40. Are you sure that the bat was put into an outer shell, after it was removed from the machine, for the purpose of hardening the tip?

(Objected to, as witness has not made that specific statement.)

A. I am sure it was in a shell for the purpose of hardening the tip after it came out of the machine.

312 (Witness asks plaintiffs' counsel what his meaning is, whether it was put in the shell, or the shell put on the bat. I answered him from his answer to my question: his answer was, it is immaterial which way.

Before the witness answered the question, plaintiffs' counsel told the witness that it was immaterial; that he simply wished to know whether this was done before or after the bat was taken from the machine.)

X Q. 41. Can you answer, from recollection, whether it
313 was in the shell before or after it came out of the machine?

A. I believe I answered from recollection before.

X Q. 42. Are you sure of that?

A. I am.

X Q. 43. Was this done before the bat and net-cone was taken off the cone-frame?

A. It was not.

X Q. 44. Did the outer shell cover the tip only, or the entire bat?

A. The entire bat.

314 X Q. 45. Was the bat removed from the net-cone while the net-cone was on the solid cone?

A. It was.

(Plaintiffs' counsel, without waiving his right to object to the hearsay testimony of the witness on his examination in chief, put the following questions in reference thereto:)

X Q. 46. Will you name the persons whom you say you heard say that the hats or bats made on the said Fosket machine were better than any made by hand?

315 A. Mr. B. F. Washburn, George Washburn, James Talman; those are the only hatters that I think of now.

X Q. 47. Where did they reside at that time, and where do they now reside?

A. They resided in Ware, Massachusetts; Mr. Talman resides there now. Both the Washburns have since died.

X Q. 48. Was any one of the bats made on that machine made up into a hat in your presence; and if so, by whom and where?

A. There was not.

316 X Q. 49. How many hat bodies were made on that machine, in your presence, which were fit to be made up into good hats, without requiring to be patched, or in any way mended by hand, before being sized and blocked?

A. I cannot tell how many.

X Q. 50. Were there any so made, as called for in the last question, to your own knowledge, and so made in your presence?

A. There were.

X Q. 51. State about the greatest number that you can
317 remember.

A. I have seen from half a dozen to a dozen made while I was by the machine; I have been at the machine and seen hat bodies made on it from fifteen to twenty times.

X Q. 52. Do you mean to say that the number specified in your last answer were made at any one time while you stood at the machine?

A. From six to twelve bodies at one time.

X Q. 53. Name the persons who were present when said
318 bodies were made as referred to in your last answer.

A. Mr. William Fosket, Mr. B. F. Washburn, Mr. Henry Lyon; I don't know that I can identify any other now.

X Q. 54. Where did they then, and where do they now reside?

A. They resided in Ware; Mr. Fosket now resides in Meriden, Connecticut; Mr. Washburn and Mr. Lyon have since died.

X Q. 55. How long a time did it require to make the number of hat bodies, and harden and remove them from the net-cone, to which you have referred as having been made at one time,
319 when you stood by the machine, and the number of hands occupied and employed in connection with the entire series of operations?

A. I think they were made and could have been made in one hour. Not more than two hands were employed to do it.

X Q. 56. Was the last answer given from conjecture, or from your knowledge of what actually took place at the time specified in the question?

A. From my knowledge of it, as near as I can recollect.

320 X Q. 57. Did the working of the machine referred to in your last four answers take place before or after you transferred your interest to Mr. Lyon?

A. After.

X Q. 58. Was it before or after the patent was granted to Fosket?

A. After it was granted.

X Q. 59. How do you know that it was after the patent was granted to Fosket?

A. I know it, because I transferred what I did to Mr.
321 Lyon after the patent was granted.

X Q. 60. How did you know the patent was granted when you made the transfer to Lyon?

A. From the letters patent granted by the government to Mr. Fosket.

X Q. 61. Did you see the patent before you executed that assignment?

A. I did.

X Q. 62. Are you sure that you saw that patent before you left Ware, in 1844?

322 A. I have no reason to doubt it.

X Q. 63. Did you not, prior to the year 1846, see a machine for making hat bodies in Hague street, in the city of New York?

A. I did not.

X Q. 64. Did you not hear that there was a machine in Hague street for making hat bodies?

A. I can't say positive that it was prior to 1846 that I heard of it.

X Q. 65. Was it not about that time that you first heard of it?

A. I should think it was.

323 X Q. 66. Do you know Joseph A. Brown, now living in Palmer, State of Massachusetts?

A. I once knew a man called Joseph Brown; I never heard him called Joseph A.

X Q. 67. When did you first know him?

A. I think it was in 1829.

X Q. 68. Where did he reside in 1845 and 1846?

A. In Palmer, Massachusetts. I think I am answering to a man that is the father of the man to whom I think Mr. Keller refers; I do not know the son, Joseph A.

324 X Q. 69. Did you ever correspond with the son, Joseph A. Brown?

A. I don't recollect; I may have done so.

X Q. 70. Did you not communicate to Joseph A. Brown, or Rufus Brown, directly or indirectly, by letter or otherwise, any knowledge of the existence of a machine in New York for making hat bodies?

A. I think I have talked with Rufus Brown about a machine in New York.

X Q. 71. Did you not communicate to him that this ma-

325 chine in New York was a successful one for making hats?

(Objected to, unless the letter is produced, if the counsel relies on one.)

A. I am unable to say whether he communicated it to me, or I to him.

X Q. 72. About what time was this?

A. I am unable to say about when; it was somewhere between '46 and '48.

X Q. 73. What it not prior to 1846?

326 A. I don't think it could be.

X Q. 74. What circumstance enables you to say that it could not be prior to 1846?

A. I have no recollection of being in Palmer prior to '46 and after '44, when I left Ware.

X Q. 75. Did you not communicate to Rufus Brown that money could be obtained by the owners of the Fosket machine from the owners of the New York machine, or to that effect?

327 (Objected to.)

A. I did not.

X Q. 76. Did you understand who was the inventor or were the owners of the machine in Hague street, New York?

A. I had been told who were the owners; I think they were St. John & Burr.

X Q. 77. Did you not communicate to Mr. Fosket that there was such a machine in successful operation in New York, or to that effect?

328 A. I cannot say that I did; I conversed with him about it a great deal.

X Q. 78. When first did you converse with him about it?

A. I am unable to say when it was; I think it was when he first introduced it to me.

X Q. 79. How long after you first heard of the New York machine did you converse with him about it?

A. I think the first I heard of it I got from him; that is my impression.

329 X Q. 80. In your conversation with Fosket about the New York machine, was there anything said about obtaining money from the owners of the New York machine?

A. I have no recollection of ever speaking with him about obtaining money from the parties owning the machine in New York.

X Q. 81. Do you know if any other Fosket machine was ever constructed after the one of 1843?

A. I have seen one other.

X Q. 82. More than one?

330 A. I think only one.

X Q. 83. When first, and where did you see that other one?

A. I saw it this morning; it was in Duane street, in this city.

X Q. 84. Do you know if it belongs to George E. Cowperthwaite, the defendant?

A. I do not know.

X Q. 85. Who took you to see it?

(Defendant's counsel admits that this machine belongs to George E. Cowperthwaite, the defendant.)

331 X Q. 86. Did you ever see the machine of 1843 after you left Ware, in 1844?

A. I never did.

Re-direct resumed.

Q. 87. When you state that you saw the patent of Fosket be-

fore you made an assignment to Lyon, please state whether Exhibit No. 5 is the assignment to which you refer.

A. It is the one to which I refer.

332 Q. 88. Who showed it to you?

A. I think I saw it in Ansel Phelps' office.

Q. 89. Did you see Mr. Fosket sign any paper at that time?

A. I think I did.

Q. 90. What did he sign?

A. Some paper in relation to this patent or invention of his.

B. S. STEDMAN.

333 Subscribed and sworn to before me this 13th day of Oct., 1857.

KENNETH G. WHITE,
U. S. Com'r.

UNITED STATES OF AMERICA,

334 *Southern District of New York,*
City, County, and State of New York, ss.

Be it remembered, that on this thirteenth day of October, in the year of our Lord one thousand eight hundred and fifty-seven, I, R. E. Stilwell, a commissioner, duly appointed by the circuit court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of

335 Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, No. 9 College Place, in the city of New York, in the said

336 southern district of New York, in the State aforesaid, Edward S. Renwick, to testify and the truth to say, on the part and behalf of the defendants, in a certain suit or matter of controversy now depending and undetermined in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants.

And the said Edward S. Renwick being about the age of

337 34 years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said Edward S. Renwick, and he did thereupon depose, testify, and say as follows, viz:

Q. 1. What is your name, age, residence, and occupation?

A. My name is Edward S. Renwick; aged 34 years; reside in New York, and am a consulting engineer and solicitor of
338 patents.

Q. 2. What opportunities have you had of acquiring knowledge of science, as applied to the arts, and of investigating various branches of art, and in distinguishing features of patented inventions?

A. I have been employed in the construction of machinery and in the superintendence of machinery in motion. I am familiar with the theory of mechanics, and for the past eight years I have been employed mainly in preparing the applications for letters patent and in soliciting patents before the United States
339 Patent Office. I am often called upon to point out the similarities and differences of various inventions, and am frequently called as an expert in patent causes.

Q. 3. Have you paid any attention to the subject of hat-body making by hand and by machinery? and if so, state generally your means of knowledge in this branch of art.

A. I have seen hat bodies made by hand, and partially and wholly by machinery. I have read various descriptions of the mode of manufacturing by hand and of the modes pursued
340 in manufacturing by machinery, including various patents and certified copies of patents.

Q. 4. Have you examined and do you understand the description of a mode causing the fur, or fibrous material, to be deposited for the formation of a bat described in Newton's London Journal, vol. X, p. 73 and following, as the invention of T. R. Williams, of 1833? and if so, state what, in your opinion, are the operative parts, or combination of parts, of machinery there shown, and what is the principle and mode of operation of said ma-
341 chinery, so far as relates to causing the fur, or fibrous material, to be deposited for the formation of a bat.

A. I have examined it, and believe that I understand it. There are three machines described in the description for the purpose of making bats, upon the principle of disintegrating fur, or other fibrous material, disseminating the fibres in the air and collecting them upon a perforated exhausted moving surface. Two of these machines are for the purpose of making flat bats of fibres in continuous sheets. The third machine is for the purpose of
342 making conical or other bats upon forms. Of the first two machines, the one contains apparatus for disintegrating the fur, or other fibrous material, which is a modification of the carding-engine, with its customary feed-apron and feed-rollers, and with the addition of a fan covered at the top, revolved with considerable velocity to blow the material finely opened from the doffing cylinder of the carding-engine into the air. It also con-

tains an endless revolving apron or band of woven metallic wire, or cloth, or other perforated substance, which moves over a
343 box open at the top, and from which air is exhausted, so as to cause currents of air to set towards and pass through the perforated exhausted surface. In this machine, the fur, or other fibrous material, laid by an attendant upon the feeding end, or feeding-apron of the carding-engine, is presented to the action of the card-teeth, and by their action and that of the fan is disintegrated and thrown into the air, and the mixed current of fibres and air is impelled towards the moving perforated exhausted apron, upon which the fibres are deflected and held until the re-
344 quired thickness of bat is obtained by the currents induced by the exhaust. In the other machine for making flat, continuous bats, a common rotating picking apparatus, with its customary feeding-apron, feeding or nipping rollers, rotating toothed-cylinder, with its casing above and below the toothed or picking cylinder, is employed to disintegrate the fibrous material, disseminate the fibres in air, and impel the mixed amount of fibres and air towards a revolving, endless, perforated, and exhausted apron, upon which the fibres are deflected and held until the re-
345 quired thickness of bat is obtained by the currents induced by the exhaust.

The machine for forming conical bats contains a disintegrating apparatus similar to the one described when speaking of the first machine for forming a continuous flat bat. This apparatus, like that one, consists of a carding-engine with its customary feed-apron and feed-rollers, and with a fan for blowing the material, finely opened, on in the form of disseminated fibres into the air. It also contains a box or stand upon which the perforated conical
346 or other perforated forms are supported. This box or stand communicates by openings with the forms placed upon it. It also communicates by an opening beneath with an exhausting fan, by the operation of which the air within the stand and forms is drawn out so as to cause currents of air to set towards the exterior perforated surfaces of the forms, and to pass through those surfaces. The conical forms do not rest directly upon the stand, but are set upon wheels, the centres of which are open for the air to pass through, and which, with the forms upon them, are
347 continuously revolved, so as to present all portions of the forms in succession to the current of impelled fur and air proceeding from the disintegrating apparatus. The stand also is not connected rigidly with the casing of the fan beneath, but is constructed in such a manner that it can be turned to bring either form upon it nearest to the disintegrating apparatus. When this machine is in operation the fur or other fibrous material placed upon the feeding-apron is presented to the action of the carding-teeth, and by their action and that of the fan is disinte-

348 grated and thrown into the air. The current of mixed fibres and air is impelled towards the perforated exhausted rotating conical forms, upon which it is deflected and held by the currents induced by the exhaust, and while the deposit is taking place the continuous rotation of the forms, by presenting every portion of the surface in succession to the current of impelled fur and air, to equalize the deposit around the whole circumference of the form, so that all portions of belts of the bats at equal distances from the tips or uppermost parts thereof are of equal thickness.

349 In all these three machines I find a combination of a feed-apron, feed-rollers, and revolving cylinders, for the purpose of disintegrating fur or other fibrous material, disseminating the fibres in air, and impelling the mixed current of fibres and air towards a moving perforated exhausted surface.

In all of them I find an exhaust or exhaust current, produced by a fan, acting in connection with the impelling current, to carry the fibres towards the perforated exhausted moving surface. I find the exhaust also operating to deflect the fibres, or cause
350 them to be deflected by the induced currents upon the moving exhausted perforated surface, and operating also to cause them to be held there by the pressure of the surrounding air until a bat of the requisite thickness is obtained. In the two machines for forming continuous flat bats, the disintegrating apparatus is combined with a flat perforated exhausted moving surface. In the other machine the disintegrating apparatus is combined with rotating conical perforated exhausted forms, or with rotating perforated exhausted forms of shapes analogous to cones.

Q. 5. Please examine model Exhibit No. 6, and state
351 whether the same corresponds or differs with the machine last referred to in your answer.

A. The model is a representation of the various parts of the machine, and of their relative positions, but does not contain the card-teeth, or the teeth upon the wheels, or the bands for driving the various parts of the machine.

Q. 6. Have you examined, and do you understand the specification annexed to the application of Thomas R. Williams, on which letters patent were granted to him April 24th, 1840? and if
352 so, give your opinion as to the several points last interrogated to, in the last question but one.

A. I have examined a certified copy of the application for said letters patent to Williams, and believe that I understand the same; the machine described in the said letters patent contains a feeding-apron, a pair of feeding or nipping-rollers, a rotating cylindrical toothed picker, a trunk, and a rotating perforated exhausted cylinder to a section or portion of the cylindrical surface, of which
353 the delivery aperture of the trunk is adapted. In this ma-

chine the fur or other fibrous material placed upon the feed-apron by an attendant, is taken by the feed-roller and presented to the rapidly revolving teeth of the toothed picker, by which it is disintegrated and thrown into the trunk, into the air drawn into the trunk, through an opening beneath the feed-apron; the mixed current of fibres and air is impelled through the trunk towards the rotating perforated exhausted cylinder, by the joint action of the impulse imparted by the revolving picker, and the currents
354 induced by the exhaust, and is directed by the trunk which controls and gives form to the mixed current, and causes the fibres to assume directions which they otherwise would not, against the section of the rotating perforated exhausted cylinder, where the fibres are held until the requisite thickness of bat is obtained by the pressure caused by the exhaust in the currents of air which set towards the perforated exhausted surface; in this machine I find a combination of a feed-apron, feeding or nipping-rollers,
355 and rotating picking-cylinder, (cased in upon its upper side, and at its ends,) for the purpose of disintegrating the fur or other fibrous material, disseminating the fibres in air, and impelling a mixed current of fibres and air through a trunk towards a perforated exhausted surface; I also find the said disintegrating apparatus acting in combination with a rotating perforated exhausted surface; I also find in combination with the other parts of the machine a trunk, which receives the impelled current of fibres and air, conducts it towards the rotating perfora-
356 ted exhausted surface, and directs it for distribution thereupon; I also find the exhaust acting in connection with the impelling current to carry the fibres through the trunk to the perforated rotated exhausted surface; I also find the exhaust, or, more properly speaking, the currents induced by the exhaust, operating to deflect the fibres upon the perforated rotated exhausted surface, and to hold them there until the required thickness of bat is obtained; I also find that but a portion of the rotating perforated exhausted cylinder, or a section of the circumference thereof, whose extent is determined by the mouth or delivery end of
357 the trunk, is exposed at any one time to the impelled current of fibres; and that the bat is removed from the cylinder in the form of a continuous sheet, as fast as it is formed, of the requisite thickness.

Adjourned to 9½ a. m. to-morrow, Wednesday, October 14th, 1857.

[Mr. Keller present on the part of the complainants, and Mr. Harding present on the part of the defendants.]

Witness continues: After the above mentioned machinery is described in the Williams application, there follows a de-
358 scription of machinery for the manufacture of "hat-bodies and other irregular forms." This description is prefixed

by the statement "that it will be evident the fibrous material may be deposited upon, and consequently take the form (whatever that may be) of various woven wire-gauze, or perforated shapes or plates; for, as the materials are mixed with or suspended in the air, and are only arrested or stopped by the said wire-gauze
359 or perforated shapes or plates, the material will be drawn down and deposited over all parts of the same through which the current of air is allowed to pass; therefore any other form may be placed in the situation of the cylinder, but in this case it is not necessary to enclose the forms in casing, as shown in the preceding figures." The description of the machinery for the making of "hat-bodies or foundations," which then follows, appears to be the same as that referred to and described in my answer to question 4, as the machinery for the purpose of making conical or other bats upon forms, and embodies the same mode of op-
360 eration as that referred to in my answer to interrogatory 4, and the same combinations of parts for the formation of the bat.

Q. 7. Please examine model Exhibit No. 7, and state whether the same corresponds with or differs from the machine first described by you in your last answer; and if so, wherein.

A. The model appears to be a correct representation of all the parts and combinations of parts which I have described for the forming of the bat.

Q. 8. Have you examined, and do you understand the
361 patent of Thomas Blanchard, dated June 14th, 1837? and if so, please state what, in your opinion, are the operative parts or combination of parts of machinery there shown, and what is the principle or mode of operation of said machinery, so far as relates to causing the fur, or fibrous material, to be deposited for the formation of a bat.

A. I have examined a certified copy of the said Blanchard patent, and believe that I understand the same. The machinery described in the said patent for "making a batting, or web of fur, for the purpose of making fur-hat bodies with it, and for preparing
362 fur for napping all descriptions of hat bodies," contains a common carding-machine with one main cylinder, with its usual feed-apron, its feed-rollers, and its licker-in. This carding-engine is modified by the substitution of a rapidly revolving "fancy" cylinder—that is, a cylinder covered with coarse card teeth, forming a rapidly revolving wire-brush, in place of the usual doffer-comb. There is, also, a revolving perforated endless apron, formed of wire-cloth, placed in front of the revolving brush cylinder. The top and sides of the carding-machine are cased
363 in, and the sides of the case are extended, and enclosed above and below, and at the ends, except at the place where the feeding-apron is placed, so as to form a tight case or trunk. A

box having openings at the top is situated between the upper and lower members of the revolving apron, and communicates by means of holes cut through the side of the trunk, with an exhausting fan placed outside of the trunk. In this machine, the carding machine, with its brush cylinder, or rapidly revolving fancy, disintegrates the fur. When the machine is in operation, the fur, placed upon
364 the feed-apron by an attendant, is presented to the teeth of the carding-machine, and by this action, and that of the "quick fancy," is disintegrated, and its fibres are thrown into the air within the trunk. The mixed current of fur and air is impelled towards the moving perforated exhausted surface of the wire-cloth apron, by the joint action of the impulse imparted by the rapid revolution of the quick fancy and the currents induced by the exhaust, and is directed towards the apron by the trunk, which
365 controls and gives form to the current, and causes the fibres to assume directions which they otherwise would not. The exhaust, or, more properly speaking, the currents induced thereby, deflect the fibres upon the moving perforated exhausted apron, or wire-cloth, and causes them to be held there by the pressure of the air until the required thickness of bat is obtained. In this operation the bat is not formed upon the whole surface of the wire-cloth at a time, but upon a portion or section of that surface,
366 whose extent is determined by the size of the exhaust box placed beneath the upper member of the moving-apron or wire-cloth. There is also a provision for regulating the distribution of the fibres upon the perforated exhausted surface or wire-cloth, by varying the exhaust, or the force of the exhaust, at different parts of the perforated surface upon which the fibres are being deposited; thus, the patent states, "it is necessary to regulate the draft in such a manner that the fur will be deposited equally on all parts of the vellum when a web of uniform thickness is required, or a web may be formed thicker on one
367 side than upon the other, or thickest in the centre, and tapering towards both edges; these variations may be effected in different ways. A board may be placed in the inside of the box, under the vellum, in different positions to break or change the current of air as it passes through, which will cause the fur to deposit differently on the vellum; pipes may be placed leading from the inside of the box, that the air passing into them and out at one end may regulate the distribution; these pipes may be perforated with holes."

368 In the machinery thus described I find a feed-apron, feed-rollers, and carding-machine, covered with a casing and fitted with a quick fancy or rapidly revolving wire brush, acting in combination, and constituting a disintegrating apparatus, by which the fur is disintegrated, and its fibres thrown into the air; I also find the said disintegrating apparatus combined with a

moving perforated exhausted surface, upon which the bat is formed; and in combination with the other parts I find a casing or trunk, which receives the fibres from the disintegrating apparatus,
369 and conducts them to the perforated exhausted moving surface; I also find the exhaust, or the currents induced thereby, acting in combination with the current produced by the rapid rotation of the quick fancy to impel the fibres towards and upon the moving perforated exhausted surface; I also find that there is a provision for regulating the deposit by varying the exhaust, so as to cause greater or less quantities of fur fibres to be impelled towards and deposited upon different portions of the perforated exhausted surface, according to the will of the person who
370 attends the machine; I also find that the bat is removed from the wire-apron in the form of a continuous sheet.

Q. 9. Please examine model Exhibit No. 8, and state whether the same corresponds or differs from the machine referred to in your last answer; and if so, wherein.

A. The model appears to contain a fair representation of the principal operating parts of the machine for forming the bat; but like the model of the English Williams' machine for making conical bats, which was before exhibited to me, does not contain
371 the card-teeth, and the minor parts of the machinery.

Q. 10. Have you examined, and do you understand the mode of forming hat-bodies described in letters-patent granted to Wells, James, and Peck, September 22d, 1837? and if so, please state what, in your opinion, are the operative parts of machinery, and what the principle and mode of operation thereof, so far as relates to the formation of the bat.

A. I have examined a certified copy of the said letters-patent, and believe that I understand the same; the machinery de-
372 scribed in the patent is stated to be an improvement upon the machinery for making a batting or web for the manufacture of hat bodies, invented by Thomas Blanchard; the principal operating parts of the machinery for forming the bat are the disintegrating apparatus, the casing or trunk, and the exhausted perforated moving-apron or wire-cloth upon which the fibres are deposited; in this machine there is a provision for regulating the exhaust, so as to cause the fur fibres to be deposited evenly upon the upper surface of the vellum or wire-cloth apron; this
373 provision consists of a perforated board, which is interposed between the wire-cloth and the exhausting fan, for the purpose of varying the draft of air; there is also a statement that small thin boards fastened together, or pieces of tin or sheet-iron, or iron perforated with holes, or pipes perforated with holes, may be used for the same purpose; and that these different devices may be "fitted to the place and position of the machine by the judgment and skill of the workmen, formed on the particular case by

examining the machine under its operation, its position as
374 to air, the state of the atmosphere, and the materials to be used;" there is also a tight casing or trunk extending from the disintegrating apparatus to the perforated exhausted moving-apron, and enclosing the latter.

When this machine is in operation the fur laid upon the feed-apron by an attendant is presented by the feeding or nipping-rollers to the action of the carding cylinders, and by their operation and that of the quick fancy, or rapidly revolving wire-brush, is disintegrated, and its fibres thrown or disseminated into the air within the casing or trunk; the mixed current of fur and
375 air is impelled towards the perforated exhausted surface, partly by the impulse imparted by the rapidly revolving wire-brush, and partly by the currents induced by the exhaust; and the fibres are deflected upon the perforated exhausted surface, by the action of the exhaust, and are held there until the required thickness of bat is obtained, by the pressure of the air induced by the exhaust.

In this machine I find a feeding-apron, nipping or feeding-rollers, and carding cylinders with their casing, and the
376 quick fancy, acting in combination, and constituting a disintegrating apparatus, for the purpose of disintegrating the fur, and impelling the fibres. I also find the said disintegrating apparatus acting in combination with a moving or revolving perforated endless surface or apron, upon which the bat is formed; and in combination with the other parts of the machine, I find a casing or trunk, which receives the impelled fibres and conducts them to the perforated exhausted moving surface, thus causing them to assume directions which they otherwise would not. I also find the
377 exhaust acting in connection with the impelled current produced by the rapidly revolving brush to carry the fibres to the perforated exhausted moving surface. I also find that the fibres are deposited upon a portion of the moving perforated exhausted surface. I also find that the distribution of the fibres in the bat, or their deposit upon different parts of the perforated exhausted moving surface on which the bat is being formed, is regulated at the will of the operator by varying the exhaust, or the relative force of the exhaust, at different parts of the ex-
378 hausted perforated surface on which the bat is being formed.

In this machine, as in that of Blanchard, the bat is separated from the wire-cloth apron or vellum, in the form of a continuous bat or sheet.

Q. 11. Have you examined and do you understand letters-patent granted to Hezekiah J. Miller, dated March 5th, 1839? and if so, describe what, in your opinion, are the operative parts or the combination of parts of machinery there shown, and what the principle and mode of operation thereof, so far as relates to causing the

fur or fibrous material to be deposited for the formation
379 of a bat.

A. I have examined a certified copy of the said patent, and believe that I understand the same. The machine described and repesented in the patent is directed therein to be used in connection with a carding machine, or with a picker, or with a blowing machine, such as was known at the time among hatters for cleaning the fur from hair, etc. There is also a revolving perforated cylinder, formed of wire-gauze, and having openings in its
380 heads for air to escape from the interior of the cylinder. There is also a casing around the fan, having openings for the admission of air at its ends, and an opening at its side for receiving the material delivered to the fan by the operation of the carding machine, or the picker, or the blowing machine, used in connection with the apparatus. There is also an opening at the side of the case, through which the material thrown off by the fan is impelled, and to this last mentioned opening is fitted a
381 trunk, which conducts the material to a portion or section of the circumference of the rotating perforated wire-gauze cylinder.

When this machine is in operation, the material delivered by the carding machine, or the picker, or the blowing machine, (whichever is used,) to the fan, is impelled by the latter, in a disintegrated state, into the trunk, along with the current of air produced by the rapid rotation of the fan. The mixed current of fibres and air is conducted by the trunk (which thus causes the fibres
382 to assume directions which they otherwise would not) towards and against a section of the perforated rotating surface of the gauze cylinder, which is rotated continuously to carry off the bat as fast as it is formed, and to present new portions of the surface of the rotating gauze cylinder to the impelled current of fibres. In this machine (as there is no exhaust) the fibres are held against the perforated rotating surface by the pressure of the currents produced by the impulse imparted by the fan until the required thickness of bat is obtained, and the air which passes
383 through the perforations of the cylinder is permitted to escape freely at the opposite side to the trunk, and through the openings in the heads of the cylinder.

In this machine I find a rapidly revolving fan, which operates in combination with the carding machine, or with the picker, or with the blowing machine, with which the apparatus is connected, to constitute a disintegrating apparatus for impelling the fibres of fur.

I also find a combination of the said disintegrating apparatus with a rotating perforated cylinder, upon which the bat
384 is formed; and in combination with the other parts of the machine I find a trunk extending from the disintegrating apparatus to the rotating perforated cylinder, with its delivery end adapted

to a section of the circumference of the said cylinder, for the purpose of conducting the mixed current of fur and fibres thereto, and distributing them equally thereupon. In this machine the bat is taken off from the rotating perforated cylinder in the form of a continuous web or sheet. There is also a statement in the patent that a perforated cylinder swelled in the middle may be used, if desired, in place of the plain perforated cylinder, "for the purpose of increasing
385 the thickness of the centre part of the web, or lap of fur, so as to give more substance or thickness to the rims of the hats, two hat bodies being made from one web, as is customary."

Q. 12. Have you examined, and do you understand letters-patent of William Fosket, dated January 23d, 1846? and if so, please state what, in your opinion, are the operative parts or combination of parts of machinery described therein, and what the principle or mode of operation there shown, so far as relates to causing
386 the fur or fibrous material to be deposited for the formation of a bat.

A. I have examined a certified copy of the said patent, and believe that I understand the same; I have also seen a Fosket machine in operation; the machine described in said patent contains a feed-apron and a nipping apparatus, consisting of a plate held down by springs upon that portion of the surface of the feed-apron which passes round the adjacent roller of the feed-apron; a bow-string of the same description as that used by hatters in bowing hats by hand is strained across the feed-apron a little in
387 advance of the place where the edge of the nipping plate bears upon the surface of the feed-apron, and to this bow-string a rapid vibrating motion is imparted by a revolving tapping wheel, or wheel having a series of pins projecting from its periphery; a trunk or passage extends from the feed-apron and bow-string to a cone-stand, and at the centre of this cone-stand, and in front of the delivery end of the trunk, or that end of the trunk which is furthest from the bow-string, there is a rotating conical frame covered with muslin or fine wire-
388 gauze, or other suitable material of similar character; the cone-stand is surmounted by a chamber having elongated narrow openings at the lower parts of its sides for the admission of air; the interior of the perforated cone communicates with an exhausting fan beneath the cone-stand, by the operation of which currents of air are caused to set towards every portion of the perforated rotating exhausted cone or conical frame towards its tip as well as towards its brim; the feed-apron, nipping apparatus, and vibrating bow-string constitute the disintegrating ap-
389 paratus by which fur is disintegrated, and its fibres thrown into the air. When the machine is in operation the fur laid upon the feed-apron by an attendant is presented by the nipping apparatus to the action of the rapidly vibrating bow-string,

and by the latter is disintegrated, and its fibres disseminated in the air within the trunk; the mixed current of fur fibres and air is impelled towards a section or portion of the circumference of the lower part of the conical former by the joint agency of the impulse imparted by the disintegrating apparatus and the currents
390 induced by the action of the exhaust; as the impelled current enters the chamber a portion of it is deflected upwards by the currents which set towards the upper portion of the perforated revolving exhausted conical former, so that the fibres are deposited over the whole surface of the perforated revolving exhausted cone, as the latter is turned to present all portions in succession to the delivery aperture of the trunk from which the impelled current issues; as the impelled current is delivered by the trunk opposite the lower portion of the circumference of the cone, and as the
391 draft at this portion of the cone is stronger than at the upper portions thereof, from its closer proximity to the passage leading to the exhausting fan, the deposit of fur fibres is thicker at the lower portions of the cone than at the upper portions thereof, which receive only that portion of the current of impelled fur fibres which is deflected upwards by the currents that enter the openings at the lower parts of the sides of the chamber, and
392 set towards the upper portion of the conical former.

The tendency of a portion of the fur fibres to deposit, under the influence of these currents, upon the upper portion of the exhausted perforated rotating cone, is greater towards the close of the operation than at its commencement, because the accumulation of fur fibres upon the lower part of the cone or former, partially throttles or chokes the exhaust, while the exhaust at the upper portion of the cone, which is more thinly covered, is not choked so much, and causes a larger proportion of the current to deflect upward towards the close of the operation than at its com-
393 mencement; the rotation of the conical former insures an equal deposit of the fibres in belts passing round its circumference, while the position of the delivery aperture of the trunk near the bottom of the cone, and the deflection of only a portion of the current upwards, causes the bat formed to be thickest at the lower part of the cone, and to be thinnest at the tip.

In this machine, I find a feed-apron, nipping apparatus, and vibrating bow-string, acting in combination for the purpose of disintegrating fur, and impelling the fibres into the air within the trunk. I also find the said disintegrating apparatus acting in com-
394 bination with a rotating perforated exhausted conical former or cone, upon which the bat is formed of the required shape. I also find, in combination with the other parts of the machine, a trunk which receives the disintegrated fibres of fur, and conducts them towards a portion of the circumference of the perforated conical former or cone. I also find the trunk acting in connection with

the chamber to prevent the escape of the fur fibres. I also
395 find the exhaust, or the currents induced thereby, acting in connection with the impulse imparted by the disintegrating apparatus to carry the current of fur fibres towards and against the perforated exhausted conical form or cone. I also find that in this machine the currents induced by the exhaust, entering through the openings at the lower part of the chamber, in connection with the position of the delivery end of the trunk, operating to effect the distribution of fibres in the bat, so that a bat is formed thicker at the brim, or lower part of the cone, than at its tip. I also
396 find that the fibres are held upon the perforated exhausted former by the pressure of the surrounding air induced by the exhaust, until the required thickness of bat is obtained.

Q. 13. Have you examined, and do you understand, the specifications annexed to the reissued patent of Henry A. Wells, dated September 30th, 1856? and if so, please state what, in your opinion, are the operative parts, or combination of parts, of machinery there shown. What is the principle or mode of operation of said
397 machinery so far as relates to causing the fur or fibrous material to be deposited for the formation of a bat?

A. I have examined a certified copy of the said letters patent, and believe that I understand the same. The machine described in the said patent contains a feed-apron, and a nipping apparatus, formed by an upper apron, bearing upon the lower or feed-apron at the delivery end thereof. The aprons pass around lips, or small rollers, where they approach each other, so as to constitute jaws, between which the fur is nipped. Adjoining this
398 nipping apparatus there is a rapidly revolving brush, cased in at the side nearer the feed-apron and at its ends, and having an opening in the casing below the level of the feed-apron for the admission of air. In front of the revolving brush, and at some distance therefrom, there is a cone-stand, having an exhausting fan beneath it, with which it connects, through a circular opening, in the base of the cone-stand. The top of the cone-stand is of sufficient size to receive two conical formers, and the cone-stand can be turned so as to place either conical former nearer to
399 the brush. The conical formers, when in position, do not rest directly upon the top of the cone-stand, but upon wheels having openings at their centres for the passage of air, and these wheels are turned by an intermediate pinion upon a revolving shaft, so as to impart a slow rotary motion to the wheels and cones resting upon them. But one cone is used at a time, the opening in the other wheel on the cone-stand being closed by a cover. The machine also contains an enclosed case or trunk, which extends from the casing of the brush towards the perforated rotating ex-
400 hausted conical former or cone upon the cone-stand. As the cone stands upright, and is much higher than the diameter

of the brush, the form or section of the trunk, as it progresses from the rotating brush towards the cone, is greatly changed; its top being "gradually elevated, and its sides contracted to make the delivery aperture nearly of the form of the cone, but narrower." Its forward or delivery end is provided at its bottom with a hinged flap, regulated by a cam lever, "as a means of regulating the delivery of the fibres." The upper part of the delivery aperture of the trunk is provided with a hinged hood, "so curved as to
401 correspond generally with the curve of the tip of the cone." This hood is connected with an eccentric and other mechanism, "so that each revolution of the eccentric carries the hood up and down to direct the discharge and distribute the fibres on to the cone." The trunk, with these appendages, is constructed to turn on the journals of the brush, and "its bottom rests on a set-screw to regulate the delivery end of the trunk or chamber relatively to the cone."

When this machine is in operation, the delivery end of
402 the trunk is adjusted by the set-screw to set it in a proper position with respect to the cone. The fur laid upon the feed-apron by an attendant is presented by the nipping apparatus to the action of the rapidly revolving brush, by which it is disintegrated, and its fibres thrown or disseminated into the air within the trunk. The mixed current of fur fibres and air which enter the opening below the level of the feed-apron is impelled along the trunk, partly by the impulse imparted by the rapidly revolving brush,
403 and partly by the currents induced by the exhaust, towards the revolving perforated exhausted cone, and is directed for distribution upon the surface of the said cone by the form of the delivery end of the trunk, which is regulated by the position of the hinged flat at its lower side, and a hinged hood at its upper side, which hinged hood is waved up and down while the bat is forming by the operation of the eccentric and its mechanism. The form of the delivery aperture of the trunk or chamber directs the
404 fibres against a portion of the circumference of the revolving perforated exhausted cone, or a section of the circumference thereof, whose extent is defined by the adjacent lips or edges of the delivery aperture of the trunk; and as the cone is rotated while the deposit is taking place, so as to present all parts of its circumference in succession to the impelled current issuing from the delivery end of the trunk or chamber, the bat is formed upon all portions of the surface of the cone in belts of equal thickness, while at the same time the peculiar form of the delivery end of the trunk or
405 chamber causes a larger quantity of fibres to be distributed towards and around the base of the cone than at its upper portion, and the bat formed is thicker around the base or brim than at the tip.

In this machine I find the feed-apron, nipping apparatus and

rotating brush with its casing acting in combination, and constituting a disintegrating apparatus for disintegrating fur, and disseminating the fibres into the air; I also find a combination of the said disintegrating apparatus with a rotating perforated exhausted conical former or cone; I also find in combination with the other
406 parts of the machine a trunk having a delivery aperture of variable form, which trunk receives the disseminated fibres, causes them to assume directions which they otherwise would not, conducts them towards the perforated former, and by the peculiar form of its variable mouth directs them for distribution upon the surface of the said cone; I also find the exhaust or the currents induced thereby, acting in connection with the impulse imparted by the revolving brush to carry the fibres towards and against the revolving perforated exhausted former; I also find that the fibres are held upon the perforated exhausted former by the pressure
407 of the surrounding air, induced by the exhaust, until the required thickness of bat is obtained.

Adjourned to October 15th, at 9½ a. m.

October 15th.—Present the parties and their counsel.

Q. 14. Have you visited the factory of George E. Cowperthwaite, at Danbury, and do you understand the machinery and mode of operation thereof, and the manner in which hat-bodies are formed at said factory? and if so, what, in your opinion, are the
408 operative parts or combination of parts of machinery there used, and what is the principle or mode of operation thereof, so far as relates to causing fur to be deposited for the formation of a bat?

A. I was in the factory of George E. Cowperthwaite, at Danbury, for about half an hour, I think in December last; I have since seen a large machine which appears to be the same as one of those that I saw there, and have seen the operation of forming a bat effected by its use. In the Cowperthwaite machine there is a feed-apron, a pair of feeding or nipping-rollers, and a toothed picking
409 cylinder, surmounted by a second similar picking cylinder, and behind these picking cylinders there is a slanting board or fence, which extends upwards from the upper nipping-roller, a little above the level of the top of the upper picking cylinder; in front of the picking cylinders, and at a short distance therefrom, but below their level, there is a perforated cone, supported by a cone-stand; this cone-stand is not directly in front of the pickers, but sets at one side, and supports three cones which radiate from it like the spokes of a wheel from its hub; the position of this cone-stand with reference to the frame that sustains the picking-rollers is
410 such that one of the cones is supported in a position nearly horizontal, and with its upper surface parallel, or nearly so, with the axes of the picking cylinders; the cone-stand is placed upon a box or base in which an exhausting-fan is placed, and its interior

of the brush, the form or section of the trunk, as it progresses from the rotating brush towards the cone, is greatly changed; its top being "gradually elevated, and its sides contracted to make the delivery aperture nearly of the form of the cone, but narrower." Its forward or delivery end is provided at its bottom with a hinged flap, regulated by a cam lever, "as a means of regulating the delivery of the fibres." The upper part of the delivery aperture of the trunk is provided with a hinged hood, "so curved as to
401 correspond generally with the curve of the tip of the cone." This hood is connected with an eccentric and other mechanism, "so that each revolution of the eccentric carries the hood up and down to direct the discharge and distribute the fibres on to the cone." The trunk, with these appendages, is constructed to turn on the journals of the brush, and "its bottom rests on a set-screw to regulate the delivery end of the trunk or chamber relatively to the cone."

When this machine is in operation, the delivery end of
402 the trunk is adjusted by the set-screw to set it in a proper position with respect to the cone. The fur laid upon the feed-apron by an attendant is presented by the nipping apparatus to the action of the rapidly revolving brush, by which it is disintegrated, and its fibres thrown or disseminated into the air within the trunk. The mixed current of fur fibres and air which enter the opening below the level of the feed-apron is impelled along the trunk, partly by the impulse imparted by the rapidly revolving brush,
403 and partly by the currents induced by the exhaust, towards the revolving perforated exhausted cone, and is directed for distribution upon the surface of the said cone by the form of the delivery end of the trunk, which is regulated by the position of the hinged flat at its lower side, and a hinged hood at its upper side, which hinged hood is waved up and down while the bat is forming by the operation of the eccentric and its mechanism. The form of the delivery aperture of the trunk or chamber directs the
404 fibres against a portion of the circumference of the revolving perforated exhausted cone, or a section of the circumference thereof, whose extent is defined by the adjacent lips or edges of the delivery aperture of the trunk; and as the cone is rotated while the deposit is taking place, so as to present all parts of its circumference in succession to the impelled current issuing from the delivery end of the trunk or chamber, the bat is formed upon all portions of the surface of the cone in belts of equal thickness, while at the same time the peculiar form of the delivery end of the trunk or
405 chamber causes a larger quantity of fibres to be distributed towards and around the base of the cone than at its upper portion, and the bat formed is thicker around the base or brim than at the tip.

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rotating brush with its casing acting in combination, and constituting a disintegrating apparatus for disintegrating fur, and disseminating the fibres into the air; I also find a combination of the said disintegrating apparatus with a rotating perforated exhausted conical former or cone; I also find in combination with the other
406 parts of the machine a trunk having a delivery aperture of variable form, which trunk receives the disseminated fibres, causes them to assume directions which they otherwise would not, conducts them towards the perforated former, and by the peculiar form of its variable mouth directs them for distribution upon the surface of the said cone; I also find the exhaust or the currents induced thereby, acting in connection with the impulse imparted by the revolving brush to carry the fibres towards and against the revolving perforated exhausted former; I also find that the fibres are held upon the perforated exhausted former by the pressure
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409 cylinder, surmounted by a second similar picking cylinder, and behind these picking cylinders there is a slanting board or fence, which extends upwards from the upper nipping-roller, a little above the level of the top of the upper picking cylinder; in front of the picking cylinders, and at a short distance therefrom, but below their level, there is a perforated cone, supported by a cone-stand; this cone-stand is not directly in front of the pickers, but sets at one side, and supports three cones which radiate from it like the spokes of a wheel from its hub; the position of this cone-stand with reference to the frame that sustains the picking-rollers is
410 such that one of the cones is supported in a position nearly horizontal, and with its upper surface parallel, or nearly so, with the axes of the picking cylinders; the cone-stand is placed upon a box or base in which an exhausting-fan is placed, and its interior

communicates with the exhausting-fan through openings made in the upper side of the base.

The cones are not secured directly to the face of the cone-stand, but are attached to rims or ring-plates secured to shafts
411 extending into the cone-stands, and there connected with mechanism, by which the rims and cones secured to them are caused to revolve slowly when the machine is in operation; the cone-stand is secured to the base in such manner that it can be turned by an operator to bring all of the cones in succession in front of the picking cylinders, and to carry the one that happens to be there away from its position; the interior of two of the cones communicates by holes in the rims, to which they are secured,
412 with the interior of the cone-stand, and through it with the exhausting-fan beneath; there is a partition in the base of the cone-stand extending upwards in the interior of the cone-stand, opposite the base of the third cone, so that a small portion of the out-going current from the exhausting-fan is passed through this third cone.

When the machine is in operation it is attended by two operators, one of whom stands at the cone, and the other at the feed-apron, and who operate conjointly; the one at the cone instructing the other as to the manner in which he is to do his work of
413 placing the fur upon the feed-apron.

The relative positions of the cone and picking apparatus are such that fur placed upon any particular portion of the feed-apron, and disintegrated by the picker, will be collected upon a corresponding opposite portion of the revolving perforated exhausted cone in the form of a belt, as the latter is turned upon its axis; when the machine is in operation the feed-boy commences by placing a portion of the fur upon that portion of the feed-apron which is opposite the base or brim of the cone, in the form of a stripe, of width corresponding with the belt of fur to be collected
414 upon the cone to constitute the thickening of the bat at this portion of the cone; the length of the stripe of fur thus placed by the feed-boy is such as is in his judgment sufficient to contain fur enough to form this belt; the feed-boy then lays the fur upon the feed-apron in a wider stripe, corresponding in breadth with the length of the cone from brim to tip, and he continues to place it in this way, and the fur so placed is collected upon the whole surface of the cone, until the cone-tender instructs him that
415 the bat is thick enough at the tip; if then there be any fur remaining of the quantity weighed out to form a bat, this remainder is placed on the feed-apron in the form of a narrow stripe upon that portion or side thereof which is opposite to the brim of the cone, and the fur so placed is passed through the picker, and is collected upon the brim of the cone, thus increasing the thickness of the bat at that part; while the fur is collecting the cone is

continually revolving, so as to equalize the deposit or thickness of the bat around its circumference, while the peculiar mode of
416 feeding causes the brim of the bat to be thicker than the tip.

In this machine I find a combination of a feed-apron, feeding or nipping-rollers, and revolving toothed picking-cylinders, constituting a disintegrating apparatus for the purpose of disintegrating fur and throwing the fibres into the open air; I also find that the fence above the nipping-rollers prevents the fur upon the feed-apron from being accidently pushed over them; it also acts in connection with the upper picking-cylinder, like the casing of
417 the ordinary wool-pickers, to prevent the picked fibres from being thrown backwards towards the feed-boy, and to cause them to pass off in a direction away from the feed-box, and towards the cone; the upper picking-cylinder also operates to pick more thoroughly, or disintegrate those portions of the fur which are carried by the revolution of the lower picking-cylinder between the two picking-cylinders. In the said machine I also find that the disintegrating apparatus acts in combination with a rotating perforated exhausted conical form or cone, upon which the bat is collected.

418 I also find that the exhaust, or the currents induced thereby, act jointly with the impulse imparted by the pickers to carry the fibres towards the perforated exhausted surface, but a careful observation of the operation of the machine, and experiments tried with it here, show me that the deflection, and consequent deposit of the fibres, upon the perforated exhausted surface, is due almost entirely, if not wholly, to the action of the exhaust. I also find that the fibres are held upon the perforated surface until the required thickness is obtained by the pressure of the
419 surrounding air, caused by the exhaust.

I also find that the variation in the thickness of the bat from brim to tip, is effected by the combined judgment, skill and manipulation of two operatives, without the employment of any mechanical device to regulate the distribution of the picked fur fibres.

Q. 15. Please examine the large machine now present, and the model Exhibit No. 1, and state how this machine and the model compare with the machines you saw in operation at Cowperthwaite's, and state also the position of the upper picker in such ma-
420 chines as you saw there.

A. The large machine appears to be the same as one of those I saw at Cowperthwaite's, or just like it; and the relative positions of its operative parts appear to be the same now as they were when I saw the machine in operation at Danbury. The model is a fair representation of the principal operative parts of the large machines, and of their relative positions; the frame-work of the picking apparatus in the model is more like the frame-work in

one of the other machines I saw at Danbury, than it is like
421 the frame-work of the large machine here present. When I saw the large machines in operation in Danbury, I noticed the position of the upper picker relatively to the lower; I saw that it slightly overhung the lower, as it does in the model, and as in the large machine here present, but that it was set as nearly over the lower cylinder as the construction of the castings of the machine would permit.

Q. 16. Please examine drawings Exhibits Nos. 10 and 11, and state what they represent.

A. Exhibit No. 10 is a representation of a vertical longitu-
422 dinal section of some of the operating parts of the large machine here present, as it would appear if cut through lengthwise through the centre of the feed-apron, feed-roller and picking-roller, and showing also the size and position of the part of the cone opposite the centre of the picking-rollers.

All of the parts being shown of their full size, and in the exact position they occupied in the large machines when I saw the latter in operation in this city, as determined by measurement; the lower edge of the paper representing the line of the floor; the
423 fence also appears upon this drawing.

Exhibit No. 11 represents an inside view of a portion of one of the sides of the picker-frame of one of the large machines, of the exact size of the machine; it also shows in red lines the positions of the feed-aprons, feed-rollers, and picking cylinders and fence, relatively to the sides of the frame.

Q. 17. Please state whether hats could be formed on the Williams machine, with the conical former described in New-
424 ton's Journal, vol. 10, and in his application for American patent, above referred to by you, with a brim thicker than the tip; and if so, by what process or mode of using them could they be so formed?

A. I think such hats could be formed on that machine without any alteration or modification of its parts. Thus, an operator might be placed at the cone, who should at intervals scrape off with his hands portions of the fibres that are depositing or collecting upon the perforated conical exhausted former, and return
425 the same to the feed-box at the feed-apron. The result would be, that the hat, when completed, would be thicker at those parts where no portion of the fibres had been removed than they would at other portions. The operation would be analogous to the scraping away of snow during a snow-storm, for when the fall of snow had ceased there would be a thinner deposit of snow upon the surface of the ground, from which a portion of the snow had been removed or scraped off, than at places where the deposit had not been disturbed.

Q. 18. By what change, if any, could the said Williams
426 machine be made to operate on the principle of the patent of September 30th, 1856, reissued to Burr, St. John, and others?

A. By setting the cone-stand, with the cone upon it, at a greater distance from the disintegrating apparatus, and by interposing between the two a chamber or trunk, constructed as described in said reissued patent, with "its top gradually elevated, and its sides contracted, to make the delivery-aperture nearly of the form of the cone, but narrower and higher," with "its forward end" "provided with a hinged flap," as described in said patent, "as
427 a means of regulating the delivery of the fibres," and "its upper part" "provided with a hood, so curved as to correspond with the curve of the tip of the cone," and operated as set forth in said patent, "to direct the discharge and distribute the fibres on to the cone."

Q. 19. By what change, if any, could the said Williams machine be made to operate on the principle of the large Cowperthwaite machine now present?

A. By moving the cone-stand sideways from in front of
428 the disintegrating apparatus, and modifying it in such manner that it would support the cone with its axis nearly horizontal, and its upper surface parallel, or thereabouts, with the axis of the cylinders of the disintegrating apparatus, and in front and below the level of the same; the mechanism of the cone-stand being adapted to turn the cone upon its axis, or to cause it to rotate in this new position.

Q. 20. For what purpose must a trunk and its hinged mouthpieces be interposed between the disintegrating apparatus
429 and the cones in the Williams machine to change it into a Wells machine, as stated by you?

A. In order to conduct the picked fibres from the disintegrating apparatus towards the cone, causing them to assume directions which they otherwise would not, and to direct the discharge and distribute the fibres on to the cone.

Q. 21. For what purpose must the Williams cone be changed so as to have its surface parallel, or nearly so, to the axes of the cylinders of the disintegrating apparatus, in order to operate on
430 the principle of the Cowperthwaite machine?

A. In order that fur placed upon any particular portion of the feed-apron, and thrown off by the disintegrating apparatus, may be collected upon a corresponding opposite portion of the cone, so that two operators, the one standing at the cone, and the other at the feed-apron, may, by their combined judgment, skill, and manipulation, produce a bat of greater thickness at the brim of the cone than at the tip thereof, by the placing of the fur
431 in a proper manner upon the feed-apron.

Q. 22. Have you ever tried any experiments to ascertain what influence the pickers have upon the current of fur fibres proceeding to the cone in the Cowperthwaite machine? if so, state the same.

A. I have. I have stopped the exhaust in the Cowperthwaite machine, and placed fur upon the feed-apron, which was disintegrated and thrown off by the pickers. This experiment was tried when there was a cone of medium size upon the machine.

432 In this case, the greater proportion of the fibres thrown off by the picker passed across over the cone towards the opposite side of the room, an exceedingly minute portion falling to the floor between the cone and the frame of the picking apparatus, and the great bulk of the fibres falling to the floor beyond the cone. I have also stopped the rotation of the cone while the picking apparatus was in operation, and the exhaust was also in operation. In this case I found that the fibres were collected upon the cone, and formed a bat, covering the whole of the cone, but thicker on the upper side of the cone than on the lower; the thickest

433 portion extending in a line lengthwise of the cone, a small distance nearer the picker than the uppermost line of the cone, or that line which is perpendicularly above the axis of the cone. In another experiment, a board about three inches in width, and of a length greater than the length of the picking cylinders, was held between the picking cylinders and the cone, the length of the board being parallel with the axes of the picking cylinders, and the face of the board being at a distance of about an inch from the teeth of the picking cylinders. This board was placed in

434 different positions, at one time being in front of the lower picking cylinder, at another time in front of the upper, and at a third time opposite the space between the two. In the last mentioned case, I found that when the exhaust was off, the current of fibres and air thrown off by the picking apparatus divided against the face of the board, a portion passing upwards, and another portion passing downwards; but when the exhaust was on, I found that the divided portions of the current bent over the edges of the board, the one over the upper edge, and the

435 other over the lower edge, and proceeded towards the cone, and that the fibres were deposited thereon, apparently in the same manner that they were when no board was interposed between the picking apparatus and the cone. When the interposed board was moved downwards, the great body of the current was deflected upwards; and when the board was moved above its central position, the great body of the current was deflected downwards; but, in both cases, when the exhaust was in operation, the current proceeded towards the cone, and the fibres were collected thereupon.

436 I have also tried the experiment of running a single picking cylinder, as, for example, the lower picking cylinder of

the Cowperthwaite machine, in connection with the nipping-rollers and feed-apron, and without the upper picking cylinder and the fence behind the same. When the picking cylinder was run, or revolved in the same direction as the lower picking cylinder of the Cowperthwaite machine, the fur fibres were carried round with it and thrown back over the feed-apron, which thus acted, like the casing and deflecting board of the ordinary wool-picker, to
437 cause the fur fibres to pass off from the picking cylinder. When, on the other hand, this picking cylinder was run in an opposite direction, or in the same direction in which the upper picking cylinder of the Cowperthwaite machine runs, the fur fibres were carried round with the cylinder and thrown backwards under the lower side of the feed-apron, which thus acted, like the casing and deflecting board of the ordinary wool-picker, to cause the fibres to pass off from the picking cylinder. I have also noticed, in the operation of the machine, that there are fur fibres passing
438 round with the upper picking cylinder.

From these experiments, and from observing the operation of the machine, it appears to me that the lower picking cylinder takes the fur fibres from the nipping-rollers, and carries them upwards until they arrive within the vicinity of the upper picking cylinder, and that the upper cylinder takes a small proportion of the fur fibres which are carried by the lower cylinder between the two, carries them over it, (the upper one,) and downwards in front of it, until they arrive within the vicinity of the lower cyl-
439 inder, when the two currents of fibres carried by the two cylinders impinge upon each other, unite, and pass off from the picking apparatus in a direction from the feed-apron, and towards the cone. As the current produced by the lower cylinder, which carries the most fibres, is stronger than the current proceeding from the upper cylinder, the combined current proceeds from the picking apparatus in a direction which is inclined upwards from the common tangent of the two cylinders, and is not im-
440 pelled directly against the cone, but in a direction, as I before stated, that causes by far the greater portion of the fibres to pass over a cone of medium size, when the exhaust is not in operation.

When, however, the exhaust is in operation, the fibres passing from the picking apparatus, and which would otherwise pass across the top of the cone, are deflected downwards and collected upon it; and by placing my face directly opposite the tip of the cone, in line with the axis thereof, I noticed that the fibres appeared
441 to be collecting upon, apparently, all portions of its circumference at the same time, some of the fibres passing downwards around the side of the cone furthest from the picking apparatus, and collecting upon the lowermost portion of the circumference of the cone. If a cone of small size had been used, still less

fibres would have fallen between it and the picker when the exhaust was off; and if a cone of larger size had been employed, rather more fibres would have fallen between it and the picking apparatus.

442 It thus appears to me that the main agency in deflecting the fibres upon the cone, and in causing them to collect thereupon, is the exhaust or the currents induced thereby, and that the pickers exert an exceedingly slight influence upon the currents proceeding to the cone, other than that they throw the fibres within the reach of the currents induced by the exhaust.

Q. 22. In your opinion does the Wells machine and its mode of operation, so far as forming the bat is concerned, as described in the reissued patent of September 30th, 1856, correspond

443 in construction, action and principle, with the construction, mode and manner of operation of the Cowperthwaite machine, so far as forming the bat is concerned? state fully, and give your reasons therefor.

A. In some respects the construction of the two machines is alike, and in others it is different; thus in each machine there is a combination of a feed-apron, nipping apparatus, and rotating cylinder or cylinders, constituting a disintegrating apparatus for the purpose of disintegrating fur, and throwing off the fibres. In the machine of the reissued patent there is a casing round a portion of the revolving cylinder similar to the casing of the cyl-

444 inder of a wool-picker, which prevents the fibres from being thrown backwards, and causes them to pass off in a direction from the feed-apron; in the Cowperthwaite machine the upper picking cylinder and the fence behind it act like the casing of the ordinary wool-picker to prevent the fibres from being thrown backward, and cause them to pass off in a direction from the feed-apron; the two disintegrating apparatus of the two machines, as apparatus for disintegrating fur and throwing off the fibres, are substantially alike; although the construction of the two, in

445 the peculiarities of their respective nipping apparatus, and picking cylinders, and the casing thereto, or the parts which act as a casing, in the Cowperthwaite machine, are substantially different.

In each machine there is a perforated exhausted rotating conical former or cone, which operates in combination with the disintegrating apparatus; but the relative positions of the cone in the two machines is different, and the cone of the Cowperthwaite machine could not be placed in the position of the cone of the re-

446 issued patent machine, relatively to its (Cowperthwaite's) disintegrating apparatus, without disorganizing the Cowperthwaite machine in such manner that the mode of operation pursued with that machine for forming a bat could not be employed.

The reissued patented machine contains, in combination with the disintegrating apparatus, and perforated rotating exhausted cone, a chamber or trunk having a delivery aperture at the cone fitted with a hinged flap and hinged hood, by the operation
447 of which the picked fibres are conducted from the disintegrating apparatus towards the cone, and the discharge and the distribution of the fibres on to the cone are directed. The Cowperthwaite machine has no trunk or chamber, or delivery aperture thereof, or hinged flap or hinged hood, or any mechanical device whatever for conducting the picked fibres from the disintegrating apparatus towards the cone, and directing the discharge and distribution of the fibres on to the cone; and in this respect
448 the two machines are substantially different.

In the operation of the reissued patent machine the fur is placed upon a feed-apron without reference to the position which its disintegrated or picked fibres are to occupy upon the cone, and so far as my knowledge of the operation of the machine extends, the placing of the fur towards one side, or towards the other side of the feed-apron, would not produce a material difference in the formation of the bat. In the Cowperthwaite machine, on the contrary, the fur is placed upon the feed-apron, with special
449 reference to the position which its picked fibres are to occupy upon the cone, and the placing of the fur towards one side or towards the other of the feed-apron produces a material difference in the formation of the bat, as in one case the bat would be thickest at the brim of the cone, and in the other at the tip thereof. In this respect the mode of operation of the two machines is substantially different.

In the reissued patent machine, the distribution of the fibres on to the cone is directed by the form of the delivery aperture
450 or mouth of the trunk or chamber, the distribution being effected by operating upon the fibres after they are picked, and before they are collected upon the cone. In the Cowperthwaite machine the fibres after being picked are not directed for distribution by any mechanical device whatever; the picked fibres proceeding in this machine from the picking apparatus to correspondingly opposite portions of the cone. In this respect the mode of operation of the two machines is substantially different.

In both machines the fibres are held upon the surface of
451 the cone by the pressure induced by the exhaust, and in both machines the currents induced by the exhaust act in connection with the impulse imparted by the picking apparatus, to cause the fibres to proceed from the picking apparatus on to the cone.

In the reissued patent machine, the current of mixed fibres and air is directed by the trunk, with its peculiar mouth, or delivery aperture, against a section of the circumference of the perforated cone. In the Cowperthwaite machine the current of mixed fibres

fibres would have fallen between it and the picker when the exhaust was off; and if a cone of larger size had been employed, rather more fibres would have fallen between it and the picking apparatus.

442 It thus appears to me that the main agency in deflecting the fibres upon the cone, and in causing them to collect thereupon, is the exhaust or the currents induced thereby, and that the pickers exert an exceedingly slight influence upon the currents proceeding to the cone, other than that they throw the fibres within the reach of the currents induced by the exhaust.

Q. 22. In your opinion does the Wells machine and its mode of operation, so far as forming the bat is concerned, as described in the reissued patent of September 30th, 1856, correspond

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447 of which the picked fibres are conducted from the disintegrating apparatus towards the cone, and the discharge and the distribution of the fibres on to the cone are directed. The Cowperthwaite machine has no trunk or chamber, or delivery aperture thereof, or hinged flap or hinged hood, or any mechanical device whatever for conducting the picked fibres from the disintegrating apparatus towards the cone, and directing the discharge and distribution of the fibres on to the cone; and in this respect
448 the two machines are substantially different.

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In the reissued patent machine, the distribution of the fibres on to the cone is directed by the form of the delivery aperture
450 or mouth of the trunk or chamber, the distribution being effected by operating upon the fibres after they are picked, and before they are collected upon the cone. In the Cowperthwaite machine the fibres after being picked are not directed for distribution by any mechanical device whatever; the picked fibres proceeding in this machine from the picking apparatus to correspondingly opposite portions of the cone. In this respect the mode of operation of the two machines is substantially different.

In both machines the fibres are held upon the surface of
451 the cone by the pressure induced by the exhaust, and in both machines the currents induced by the exhaust act in connection with the impulse imparted by the picking apparatus, to cause the fibres to proceed from the picking apparatus on to the cone.

In the reissued patent machine, the current of mixed fibres and air is directed by the trunk, with its peculiar mouth, or delivery aperture, against a section of the circumference of the perforated cone. In the Cowperthwaite machine the current of mixed fibres

and air is not directed against any particular portion of the
452 circumference of the cone, but is deflected by the operation of the exhaust towards all portions thereof, and in this respect the operation of the two machines is substantially different.

(Adjourned till the 16th, at 10 a. m.)

FRIDAY, *October* 16*th*, 1857.

(Counsel on both sides present.)

453 Witness continues: In the operation of the reissued patent machine, the formation of the thick deposit at the brim takes place simultaneously with the formation of the thin deposit upon the remainder of the cone; or, in other words, the thickening of the brim is effected during the formation of the remainder of the bat. In the operation of the Cowperthwaite machine, the thickening at the brim is not effected simultaneously with the formation of the remainder of the bat. In this respect the modes of operation of the two machines are substantially different, or
454 do not correspond.

From the foregoing statements and reasons, I am of the opinion that the two machines referred to in the question, and their modes of operation, so far as forming the bat is concerned, correspond in some points, and that in other points they do not correspond.

Q. 23. In the several machines to which you have been referred as prior in date to the Wells patent of 1846, please specify first, by what device or devices the fur is disintegrated; second, specify by what device or devices, if any, the fur is supplied to the
455 disintegrating apparatus; and third, by what device or devices it is presented to the disintegrating apparatus.

A. In the Williams machine, described in the tenth volume of the London Journal, the fur, or other fibrous material, is disintegrated in one of the machines for making flat bats, and in the machine for making conical bats, or bats of other form, by means of a carding-engine, fitted with a rapidly revolving fan, covered on the top. In the other machine for making flat bats, the fibrous material is disintegrated by means of the ordinary
456 picker, or rapidly revolving toothed cylinder, partially enclosed in a case.

In the machine described in the Williams American application for making flat bats, the disintegration of the fibrous material is effected by means of a rapidly revolving toothed cylinder, partially enclosed in a casing. In the machine described in said application for a patent for the manufacture of hat-bodies, and other irregular forms, the machine stated to be "generally used" contains carding-cylinders, or a carding-engine, fitted
457 with a rapidly revolving fan, for the purpose of disintegra-

ting the fibrous material; this machine appearing to be the same as the one for the manufacture of conical bats described in the aforesaid London Journal.

In the Blanchard machine the disintegration of the fur is effected by the cylinders of the carding-engine, and the rapidly revolving "fancy." In the Wells, James and Peck machine the disintegration of the fur is effected by the same devices that it is in the Blanchard machine.

458 In the Miller machine the disintegration of the fur or other fibrous material is effected by the carding-machine, (to which the Miller apparatus is applied,) and the revolving fan, or by the picker, or blowing machine, when the Miller apparatus is applied to such machines; the disintegration of the fur being effected in the last two cases before it reaches the fan.

In the Fosket machine the disintegration of the fur is effected by the rapidly vibrating bow-string.

In all of the machines there is a feed-apron upon which the fibrous material is placed to be supplied to the disintegrating ap-
459 paratus. In the Williams description in the London Journal, the fibrous material is presented to the disintegrating apparatus in one of the machines for making flat bats, and in the machine for making conical bats by the presenting apparatus of the carding-engine employed. In the other machines for making flat bats, described in said book, the fibrous material is presented to the disintegrating cylinder by a pair of common feeding or nipping-rollers, the upper of which is pressed down upon the lower by weights acting through levers and rods.

460 In the machine of the Williams American application for making flat bats, the fibrous material is presented to the disintegrating cylinder, by a pair of common feeding or nipping-rollers, the upper of which is pressed down upon the lower by weights acting through levers and rods. In the machine described in said application for the manufacture of hat-bodies, the fibrous material is presented to the carding-cylinders by the ordinary presenting apparatus of the carding-engine.

461 In the Blanchard machine the fur is presented to the disintegrating devices by the ordinary presenting apparatus of the carding-machine, which in this instance is stated to be "feed-rollers," and in the description and in the drawing are indicated as consisting of a feeding-card or revolving cylinder, covered with card-teeth, and of the forward roller, around which the feed-apron passes, so that the fur passes between the two.

In the Wells, James and Peck machine, the fur is presented to the disintegrating apparatus by a pair of fluted feeding-rollers, and an additional roller of larger size lays upon the feed-
462 apron, and revolves above the fur to prevent it from passing over the upper feed-roller.

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452 circumference of the cone, but is deflected by the operation of the exhaust towards all portions thereof, and in this respect the operation of the two machines is substantially different.

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458 In the Miller machine the disintegration of the fur or other fibrous material is effected by the carding-machine, (to which the Miller apparatus is applied,) and the revolving fan, or by the picker, or blowing machine, when the Miller apparatus is applied to such machines; the disintegration of the fur being effected in the last two cases before it reaches the fan.

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461 In the Blanchard machine the fur is presented to the disintegrating devices by the ordinary presenting apparatus of the carding-machine, which in this instance is stated to be "feed-rollers," and in the description and in the drawing are indicated as consisting of a feeding-card or revolving cylinder, covered with card-teeth, and of the forward roller, around which the feed-apron passes, so that the fur passes between the two.

In the Wells, James and Peck machine, the fur is presented to the disintegrating apparatus by a pair of fluted feeding-rollers,
462 and an additional roller of larger size lays upon the feed-apron, and revolves above the fur to prevent it from passing over the upper feed-roller.

In the Miller machine the fur is presented to the disintegrating devices by the presenting apparatus of the carding-machine, the picker, or the blowing machine, whichever one of these three machines is used.

In the Fosket machine the fur is presented to the disintegrating device by the spring-plate or nipping-plate above, and the operation of the roller beneath, around which the feed-apron passes.

463 It may be proper here to state that the means for supplying fibrous material, and the means for presenting it to the disintegrating apparatus, have an intimate connection; and that in some of the preceding machines it is not possible to separate from the machine all the parts which belong to the device for supplying without affecting the device for presenting, as for example in the Blanchard machine, in which the forward roller of the feed-apron could not be taken away without disorganizing the device for presenting the fur.

464 Q. 24. Upon what, and by what agency or means, is the fur or fibrous material caused to be deposited in the several machines to which you have been referred, as prior in date to the Wells patent of 1846?

A. In all of the machines, the fibrous material is deposited upon a perforated surface, or surface having a multitude of holes in it sufficiently large to permit air to pass, but small enough to retain the fibres. In the Miller machine, the perforated surface is not exhausted. In all the other machines the perforated sur-

465 face is exhausted. In some of the machines for making flat bats the fibrous material is deposited upon a perforated exhausted travelling flat surface; namely, in the two Williams flat-bat machines, described in the London Journal, in the Blanchard machine, and in the Wells, James and Peck machine. In the Williams American application machine for making flat bats, the fibres are deposited upon a rotating perforated exhausted cylinder. In the Miller machine the fibres are deposited upon a rotating perforated cylinder which is not exhausted. In the machine

466 for making conical bats described in the London Journal aforesaid, and in the Williams American application, and in the Fosket machine, the fibres are deposited upon rotating perforated exhausted cones. In the description of the Miller machine it is stated that a rotating perforated cylinder, swelled in the middle, approaching in form a double cone, may be used to receive the deposit of fibres; and in the description in the London Journal aforesaid, and in the Williams American application of the machine for making conical bats, it is set forth that rotating perforated exhausted formers, differing in shape from cones, may

467 be employed to receive the deposit of fibres. In the Miller machine, the agency by which the fibres are deposited upon

the perforated surface is the blast of air or impulse imparted by the rapid rotation of the disintegrating apparatus. In the other machines the agency by which the fibres are deposited is the joint action of the exhaust, or the currents induced thereby, and the impulse imparted by the disintegrating apparatus, which produce currents more or less strong, according to their respect-
468 ive construction and the speed at which they are driven.

Q. 25. What do you regard as the distinguishing feature or characteristic of the Wells machine, as described in the patent of September 30th, 1856, so far as relates to the forming of hat-bodies?

A. The distribution of the fibres upon a rotating perforated exhausted cone, or other form, so as to produce a bat thicker at some parts than at others, by means of a trunk or chamber,
469 having a delivery aperture or mouth of a form adapted to produce the required distribution.

Q. 26. What is the distinguishing feature or characteristic of the Cowperthwaite machine, so far as relates to forming hat-bodies?

A. The relative positions of the rotating perforated exhausted cone and the disintegrating apparatus, whereby two expert operators can produce a bat thicker at some parts than at others.

Q. 27. Refer to the Wells reissued patent of October 7th, 1856, and state by what means sufficient consistency is given to
470 the bat, so that it can be removed from the cone.

A. The bat formed upon the cone is prepared for hardening by covering it with pieces of felt, or fulled cloth, just taken from hot water, and with a tipless cone or cover; and the whole is immersed in hot water to harden the bat. In case the cone former is not sufficiently strong to withstand the pressure of the water, when drawing it out of the kettle, then a perforated metallic cone is put inside, before the whole is immersed in hot water, to
471 sustain the pressure in drawing the whole out of the hardening kettle. The distinguishing feature of this part of the Wells invention appears to me to be the discovery that the bat may be hardened sufficiently to permit it to be removed from the cone on which it is formed, by saturating it with simple hot water, and in the adaptation of suitable devices to carry this discovery into effect.

Q. 28. Refer to the patent of S. Hurlbut, and state by what means, if any, sufficient consistency is given to the bat while
472 upon a conical former, to admit of its being taken off.

A. By steaming it, covering it with a cloth, and working it with a conical cover or cap over the cloth.

Q. 29. Refer to the description of the Williams machine, alluded to in your examination in chief, for forming conical hat-bodies,

and state by what means, if any, is sufficient consistency given to the bat while in the perforated former, or on which it has been deposited, to admit of its being removed therefrom.

A. By covering it with a perforated cover, and dipping the whole into a hot solution or adhesive composition of glue and starch,
473 or flour dissolved in water and heated, so as to saturate the bat therewith. In the American application it is stated that the composition is generally of "weak size or solution of shellac." It is also there stated that "if the forms for hat-bodies are required for felting, they are removed to another machine, when they undergo the process of basoning or hardening while between the forms."

Q. 30. By what means in the Blanchard patent of June 14th, 1857, is sufficient consistency given to the bat, or web of fibres, to admit of its being removed from the surface on which it is
474 being deposited?

A. After the bat has been deposited of the proper thickness it passes, while on the perforated surface on which it has been formed, beneath a jiggering roller or revolving roller, having a rapid endways vibrating or tremulous motion, which "hardens it into a web of sufficient tenacity to be handled and formed into hat-bodies."

Q. 31. Refer to the patent of Wells, James and Peck, of September 20th, 1837, and state by what means sufficient consistency is given to the bat or web of fibres to admit of its being re-
475 moved from the surface on which it has been deposited.

A. By means of two jiggering rollers, like the Blanchard roller, which act in succession upon the bat while it is on the perforated surface on which it has been formed.

Q. 32. Please refer to the description of Wells' machine in Newton's Journal, vol. 13, page 191, (June 13th, 1837,) and state by what means sufficient consistency is given to the bat or web of fibres to admit of its being removed from the surface on
476 which it has been formed.

A. The bat is steamed while it is being formed by a process of winding a web of fur upon a perforated former. It is afterwards taken from the forming machine while upon the former, covered with a cap cone, and the whole placed upon a third perforated cone, supported on the upper end of a spindle. A conical roller is let down upon the outer side of the cap cone, and an alternating rotary motion is imparted to the conical roller and the cones which it bears upon, including the bat which is between the cap
477 cone and the perforated cone on which it was formed, whereby the bat is hardened; steam being at the same time admitted through the perforations of the cones inside the hat body during the process. The description also states, when speaking of the mode of forming the bat upon cones, that "the hat bodies from

these cones, or otherwise constructed upon other cones, may then be hardened in the manner next hereinafter described," which is the manner or mode of operation described in the foregoing part of my answer.

478 Q. 33. Did you hear the testimony of William Fosket, given in this case, so far as relates to the forming and hardening hat bodies practised by him in 1843? and if so, state whether you have ever seen hat bodies made and hardened as described by him.

A. I did hear the testimony given by William Fosket, as inquired of; I have also seen hat bodies made and hardened in the manner described by him.

Q. 34. Describe the mode by which sufficient consistency is given to the bat (in the modes seen by you,) so as to admit of
479 their removal from the cone on which they had been formed. (I refer to your last answer.)

A. The bat was partially hardened while it was being formed by means of a conical roller which jiggered upon the straight part of the cone, as the latter was rotating and the fibres were depositing; this was done in all cases. After the bat was formed, the chamber was opened, and the tip of the bat on the cone was patted with the palm of the hand. The jiggering-roller was then removed from the bat, and a shoemaker's awl was inserted through the tip of the bat into the grass-cloth cone, on which the bat was formed, previous to which the exhaust was stopped; then by means
480 of the awl the grass-cloth cone, with the bat upon it, was lifted off the cone-frame and taken to a hardening table, and partially hardened by working it in a damp linen cloth in the usual manner. After the bat was partially hardened in this cloth, the grass cloth was removed from the bat, and the latter was further hardened by working it in the usual manner in the damp linen cloth. I saw other bats formed upon perforated metallic cones, without the use of the grass-cloth cone. These bats, like the others, were partially hardened by the operation of the jig-
481 gering-roller, while they were being formed. After they were formed the chamber of the machine was opened, the jiggering-roller was moved from the bat, and the cone, with the bat upon it, was removed from the machine.

A cap cone or cover was then placed over the bat, and a tremulous or jiggering circular movement imparted to the cover by hand. The cover and bat and inner cone were then separated, and the bat was further hardened by working it in the usual manner in a damp linen cloth.

482 Q. 35. What in your opinion was the character of said machine, and the process of hardening so far as relates to practical use in making hat-bodies?

A. I consider that the Fosket machine I saw was a good working

machine, and that the processes of hardening which I saw were efficient, and that good hat-bodies could be made by it and hardened with considerable rapidity.

Q. 36. How long does it take to make a bat on such a machine, and what is the character of the bat when so formed?

483 A. The only time that I thought of ascertaining the speed with which the bat was formed on that machine was the last time I saw it—on last Monday afternoon. I then saw five bats formed, and carefully noted the time by watch for forming each one of them, commencing when the bow-string picker first began to act upon the fur, and ending when the bat was formed. The longest time required was 8 minutes, the shortest five and a half minutes, according to the speed at which the machine run and the fur was fed, which I noticed varied. The bats were three-ounce bats. After the bat was formed and the chamber was

484 opened, the patting of the tip of the bat, when this was done, occupied about half a minute. The bats formed were dry and thin at the tip, and thicker towards and at the brim of the cone; I noticed this fact by holding them towards the light and looking into them; there were no holes in any of them, but in one of them there was a thin place or belt just where the straight part of the cone and the round tip adjoin, and I noticed that this appeared to be caused by carelessness in putting the cone into the machine and placing the jiggering roller in contact with

485 it, as the spring of the jiggering roller caused the upper end of the latter to bear strongest upon the part of the cone where the thin place in the bat was, instead of bearing uniformly throughout the entire length of the jiggering roller.

I have the last bat made at that time, and produce the same.

It is the one which was made in five minutes and a half, and is now in the same condition that it was after the hardener hardened it. (The bat is marked "Exhibit 19.") It was not stopped

486 off or patched in any manner from the time the forming commenced till the hardener placed it in my hands. It was then wrapped up by me, and opened for the first time here. The other four bats were delivered by me to Mr. Rice, with a request to size them.

Q. 37. So far as relates to giving sufficient consistency to the bat while on the former to admit of its being removed therefrom, how does the process used by Cowperthwaite, the devices for carrying that out, and the result, or consistency given to the bat, compare with the process, device, and result, as set forth in the Wells patent, reissued October 7th, 1856?

487 A. In the Cowperthwaite process the bat is hardened on the cone on which it was formed preparatory to its removal therefrom, partly by machinery and partly by hand. When the bat was formed a loose perforated cap, cone, or cover, having a

knob secured to its tip, was placed over the cone. The cone-stand was then turned a third of a revolution. This movement carried the cone on which the bat was formed, with the bat and cover, beneath a set of rollers which rested upon the exterior surface of the cap cone, while at the same time an arm projecting
488 downwards from a vibrating rod above entered into a ring-groove in the knob of the cover. By the vibration of this rod and arm the cover was jiggered endways. As the cover was of larger diameter than the forming cone, and was pressed downwards by the weight of the rollers, it bore upon the uppermost portion, or a longitudinal stripe of the upper portion, of the bat; and as the cone and cover, with the bat between them, were turned upon their axes, the straight portion of the bat was jiggered in successive stripes or sections. This operation continued
489 while a second bat was being formed; and when the latter was formed the cone-stand was turned a second third of a revolution. This movement carried the partially hardened bat, with its cone and cover, from the jiggering apparatus; an operator then applied his hand to the cover and worked it endways and sideways, while the whole was still turning, and subsequently he took hold of the knob with his hand and worked the cover on the bat while the whole was still turning. This manipulation by the operator continued while the third bat was being formed,
490 when he removed the cover with the bat inside of it. During the jiggering by the machine the exhaust was still in operation, and no doubt caused the bat to hug the surface of the forming cone. After the cone, with the bat and cover, were turned from the jiggering apparatus, or during the time that the operator worked the cover with his hands, the exhaust was not operating on the cone, but in the place thereof a small portion of air from the outgoing side of the exhausting fan was passed up, by means of a partition in the cone-stand, into the interior of the forming cone, and no doubt caused a very slight pressure on the
491 inner surface of the bat. In the Cowperthwaite process, as thus described, the bat is hardened by jiggering it in a dry state; in the Wells process referred to, the bat is hardened by saturating it in hot water. In the Cowperthwaite process, the bat is prepared for hardening by placing a loose-fitting perforated cap, cone, or cover over it; in the Wells process, the bat is prepared for hardening by covering it tightly with wet cloths, and placing a tipless cover over them to hold them in place and cause them to press upon the bat. In the Cowperthwaite process, the bat
492 is rubbed or jiggered in sections by means of the cover, which constitutes a hollow rubbing instrument; in the Wells process, the bat is saturated with hot water while held tightly upon the cone on which it is formed, by means of the cloths and cover. In the Cowperthwaite process, the bat is hardened without

removing the cone and bat from the machine, and the bat is hardened partly while under the exhaust and partly while there is a very slight pressure of air upon its inner surface; in the Wells process the cone with the bat upon it is taken from the ma-
493 chine to harden the bat. In the Cowperthwaite process the rubbing is done for the purpose of hardening the bat; in the Wells process, whatever slight rubbing there may be in putting on the cloths and cover, and removing the same, is incidental. The cover used in the Wells process has no tip, and a cover of such construction is advantageous in the practical operation of the process, as it permits the operator to pour hot water freely upon the tip of the bat, which is there covered only by the cloth.

The Cowperthwaite cap cover has necessarily a tip, in
494 order that the tip of the bat may be rubbed by this part of the cap cone in the operation of hardening. The result in the Cowperthwaite process of hardening is a partial felting of the bat. The result in the Wells process is the cohesion of the fibres to each other, by reason of the moisture and the expulsion of the air from the bat, in the same manner that pieces of paper when moistened with water cohere to each other; and if there be any felting resulting from the application and removal of the covering cloth and cover in the Wells process, it must be excessively minute, in my opinion. I am of opinion that the Cowperth-
495 waite process and devices, and the results, are substantially different from the Wells process, devices, and result referred to in the question.

Q. 38. What change in the mode or device for hardening the bat according to the Williams process, referred to in one of your answers, would be required to render it the same in principle as that described in the Wells reissued patent?

A. The covered bat would have to be dipped into simple hot water, in the place of hot size.

496 Q. 39. What change would be required to adapt the Williams process and device to the Cowperthwaite process and device?

A. The bat would have to be rubbed in a dry state with a loose-fitting cover.

Q. 40. Which are nearest alike, the Fosket and Wells machines, or the Cowperthwaite and Wells machines, in your opinion?

A. I think the Fosket and Wells machines are more alike than the Cowperthwaite and Wells.

497 Q. 41. Which are nearest alike, the operation of the Wells and Williams machines, or the Cowperthwaite and Wells machines, (I mean for forming a bat?)

A. I think the operation of the Cowperthwaite and Williams are more alike than the operation of the Wells and Williams machines are.

[Adjourned from 4 to 6 p. m.]

Cross-examined by Mr. Keller, Counsel for the Complainants.

X Q. 42. What has been the extent of your experience
498 in the manufacture of hats by hand and by machinery?

A. I have never been engaged personally in the manufacture of hats in any way. I have seen them manufactured by both ways.

X Q. 43. When did you first turn your attention particularly to the study of this branch of the arts?

A. Some time in the year 1855. I had, however, previous to that time seen hats manufactured, and read accounts of their manufacture.

X Q. 44. Did you not turn your attention particularly
499 to this branch of the arts, as you have stated, in the year 1855, in reference to the controversy commenced between these plaintiffs, under the Wells patent, and Alva B. Taylor and Charles O. Jessup, who had machines substantially identical with the machines used by these defendants, Cowperthwaite and Taylor?

A. I did turn my attention to the subject at that time, with the expectation of being examined as expert in some controversy between, I believe, the owners of the original Wells patent and, I believe, Messrs. Taylor and Jessup. I do not know that
500 at this day, and without any notes or means of comparison, I can give a reliable opinion as to the substantial identity of the machines used in New Jersey and those in the present case. There are some points in the two machines which I recollect particularly: these are the parts employed in the hardening and the construction of the cone-stand, which, as nearly as I can recollect, were substantially identical with the same parts in the Cowperthwaite machine. If I recollect aright, the picker in the New Jersey machines which I saw at that time had only a single
501 picking cylinder.

X Q. 45. Did not the machines of Taylor and Jessup, referred to in your last answer, have the same relation of the cone to the disintegrating apparatus that it has in the machine of the defendants in the present case?

A. For the reason above stated, I cannot say whether they had "the same relation" of these parts, because that expression implies to me identity; but in those machines, if I recollect rightly, the cone on which the bat was being formed was at a short distance from the disintegrating apparatus, and was arranged with its axis nearly horizontal, with its upper surface parallel, or there-
502 abouts, with the cylinder of the disintegrating apparatus.

X Q. 46. Did you not prepare the specifications for, and on which three several letters patent were granted to Alva B. Taylor; one for improvement in machinery for making hat-bodies, dated March 18th, 1856; another for improvement in machinery for form-

ing hat-bodies, dated 29th day of July, 1856; and the third for improvement in the manufacture of hat-bodies, dated August 20th, 1856?

A. I did.

503 X Q. 47. In the machine of T. R. Williams, described in Newton's London Journal, vol. 10, page 73, to which you have referred in your examination in chief, for making conical bats on perforated cones or other analogous forms, does not the disintegrating apparatus consist of a carding-engine with a fan described as employed to take the fibres from the doffer of the card, and disseminate them in the air?

A. The disintegrating apparatus is such as is described in the question, and the fan is described as blowing the material
504 finely opened from the doffer into the air.

X Q. 48. Have you ever ascertained by experiment whether a fan, such as is described in that patent, can be practically used for taking the fibres of fur from the doffer of the carding-engine, and throwing or disseminating them in the air?

A. I have never had the opportunity of making the experiment with a carding-engine and fan.

X Q. 49. Will you look at that figure of the drawing of the Williams machine that relates to making the conical forms,
505 and state whether the fibres are there represented as being deposited upon the exhausted former, which is nearest to or furthest from the fan?

A. There are lines upon the drawing which appear to be put there to represent the flow of the fibres, and they are represented as passing towards the former, which is furthest from the fan.

X Q. 50. Is not that part of the description and drawings of the Williams machine for forming hat-bodies, or other analogous
506 forms, on perforated exhausted formers, in his application for the American patent of 1840, referred to in your examination in chief, the same as the description and representation in the tenth volume of the London Journal, before referred to?

A. I believe the machine to be the same. The two descriptions differ in several points, the one not being a copy of the other, and in the drawing of the machine appended to the American application there are lines to represent the flow of the fibres to the form near the fan. This difference in the two drawings I do
507 not consider a difference in the machines, as it might have arisen in the drawing in the London Journal simply from the inadvertence of the engraver in making the drawing on so small a scale.

X Q. 51. In model No. 7, do you find that it represents any packing interposed between the periphery of the perforated exhausted cylinder in that part of the casing extending down to the exhausting fan, and does not the specification of the Williams patent

of 1840, as well as the specification of the application for such patent, specify the use for such packing?

508 A. In the model referred to the partition adjacent to the cylinder fits tolerably closely thereto, but there is nothing there to represent a packing in the patent referred to, and in the application referred to there are statements that there is to be a packing at this part of the machine to prevent the air and fibrous material passing between it and the cylinder when the cylinder is used.

X Q. 52. Calling your attention to the Blanchard patent, referred to in your examination in chief, will you state whether it is not the purpose of that machine to make continuous webs of fur fibres to be afterwards wound upon cones for forming them into hat bodies, as webs of wool fibres were previously wound

509 upon cones in making wool hats by what is known as the Grant & Raymond machine?

A. That special purpose is not set forth in the Blanchard patent, so far as I see. It is stated in the patent that the machine produced is "capable of making a batting or web of fur, for the purpose of making fur hat bodies with it, and for preparing fur for napping all descriptions of hat bodies, (instead of bowing it in the usual manner,) and for other purposes;" and I have no doubt that the use of the web or bat of fibres made by the machine

510 to make hat bodies, by winding it around the former, was one of the purposes.

X Q. 53. Calling your attention to the Wells, James and Peck patent, of September 22d, 1837, state whether the wires or teeth of the quick fancy, or the rapidly revolving wire brush, as you have termed it, used in connection with the card disintegrating apparatus of that machine, will not enter between the card-teeth to take hold of and draw out the fibres?

A. I do not see any statement in the patent of the pecu-

511 liar construction and operation of the teeth, or brush surface of the quick fancy. It is merely called a "quick fancy," by which I understand a fancy cylinder, constructed and operating like the ordinary fancy cylinder of a carding engine, but running at a much greater speed; and in noticing the operation of the ordinary fancy cylinder of the carding engine, I have never seen it draw out the fibres from the card cylinder with which it runs in connection; I have always understood that its purpose is to loosen or lift up, so to speak, the fibres upon the card-teeth, and that its surface in its ordinary position in the machine runs some-

512 what faster and in the same direction as the surface of the card cylinder, and that its teeth incline backwards, so that it does not comb off or draw out the fibres from the card-teeth, but in a manner brushes the fibres so as to loosen them preparatory to the action of the doffer, by whose teeth the fibres are taken off

from the main card cylinder. If therefore such a fancy cylinder be made to operate upon the doffing cylinder, and be driven "quick," or at a high speed, I think its operation would be to brush the fibres off of the teeth of the doffer, instead of its
513 teeth taking hold of and drawing out the fibres from the doffer.

X Q. 54. Is not the purpose of the means described in the said Wells, James and Peck patent, for regulating the exhausted currents described in the 9th article of the specification in the said patent, to enable the machine to make a web of uniform thickness?

A. It is so stated; and if I recollect aright, I made a statement to this effect in my direct examination.

X Q. 55. Calling your attention to the patent of Hezekiah J. Miller, referred to in your examination in chief, please state
514 whether, as the said machine has no means of exhausting the pervious cylinder on which the bat is intended to be formed, could the bat of fibres deposited on said cylinder be held on the entire circumference of said cylinder?

A. In the said patent there is no provision for holding the bat upon the whole circumference of the cylinder, and the purpose of the machine is to make a continuous flat bat, which is taken off as fast as it is formed. I have no doubt that if it was desirable
515 in that machine to hold the bat upon the whole circumference of the previous cylinder, the machine could easily be modified for the purpose.

X Q. 56. What means would you employ for holding the bat on the entire circumference of the pervious cylinder in that machine?

A. The most obvious plan to my mind would be to use the same means by which the bat is held upon a portion of the pervious cylinder, but to extend their application to the whole circumference of the cylinder. Thus, in the machine represented, the bat
516 is held against a portion of the circumference by the blast or pressure of air generated by the fan directed by the trunk against that particular portion; to hold the bat upon the whole of the circumference, the pressure of the air would have to be directed by the adaptation of the trunk to the whole circumference of the pervious cylinder, and the air passing into the interior of the cylinder would escape through the holes (I in the specification) made for the purpose.

X Q. 57. Is there not a trunk in that machine against the end of which the periphery of the pervious cylinder revolves?
517 Would not that scrape off the bat if you attempted to retain it on the entire circumference?

A. There is such a trunk, but, as I have before stated, the trunk in the hypothetical machine must be adapted to the different result

which the counsel supposed, and such an adaptation of the trunk would not scrape off the bat. As the machine is described in the patent, the bat is removed as it passes out of the trunk, and there is no doubt that if the trunk were not adapted as I have supposed, and if it were attempted to hold the bat in contact with the
518 whole circumference of the pervious cylinder, it would be stripped off therefrom in the rotation of the cylinder, as it came in contact with the upper edge of a close fitting trunk.

X Q. 58. You have stated that provision is made in said specification for forming webs of fur fibres thicker in the middle than towards the two edges, by making a swell in the pervious former, or in the form of frustra of cones united by their bases. Is the machine so modified intended to receive fur on the ends thereof?

A. It is not.

519 X Q. 59. Can you imagine how webs could be made in the machines so modified, of greater thickness in the middle than towards the edges, in view of the fact that the largest circumference of such figure corresponds to the middle of the width of the bat, and would require more fur for a given thickness than at the ends, which are of smaller circumference?

A. I do not think it requires imagination to see how a bat thicker at the central part than at the edges thereof could be made in this machine, modified as stated in the patent. It appears to me that about the same quantity of fibres would be collected
520 upon each square inch of the surface of the pervious cylinder, and there are more square inches of surface in a circular stripe of given width at the swelled portion or central part of the pervious swelled cylinder than in a stripe of the same width at the ends thereof; moreover, the bat from the increased circumference of the pervious swelled cylinder, at its central part, is, when first formed, longer at this part than at the edges. When such a bat comes to the flat surface hardening apparatus, and is flattened out between the two aprons, it will, in the loose
521 state of its fibres, stretch out at its edges until these are as long as the central portion, or full up at the central portion, or do partly both. In either case the resulting bat would have a greater mass of fibres in its centre than at its edges.

X Q. 60. Would the greater thickness of bat in the central portion thereof be formed on the swelled pervious cylinder, or be produced after it leaves the pervious cylinder?

A. As I have stated above, about the same quantity of
522 fibres, it appears to me, would be collected on each square inch of the pervious surface; and if this be correct, each part of the bat, at the time of its formation, would be of equal thickness. The difference in thickness in the hardened bat would,

in that case, be produced after the bat leaves the pervious cylinder.

X Q. 61. In the machine described and represented in the said Miller patent, whatever may be the kind of disintegrating apparatus used with it, is not a rotating fan the instrument specified for the purpose of carrying the fur fibres into and through the
523 trunk to the pervious cylinder? and if not, quote the language of the specification which states otherwise.

A. It is stated in the patent that whichever disintegrating apparatus is used, the fan is employed to blow the material through the trunk until it reaches the pervious cylinder.

Adjourned to 9½ a. m. the 17th.

Saturday, October 17th, 1857.—Counsel on both sides present.

X Q. 62. In your examination in chief, in speaking of
524 the Fosket machine, as described in his patent, you stated that it had a rotating conical frame, covered with muslin or fine wire-gauze. Will you refer to and quote that part of the specification which describes the use of that fine wire-gauze?

A. "Upon the central part of the bottom of the chamber a conical frame L of wire is raised, the same being of the size necessary for the formation of the hat body. This frame is covered on the outside with muslin or fine wire-gauze, or other suitable
525 material of similar character, and while in operation it should have a continued slow rotary movement in a horizontal direction imparted to it," etc.

X Q. 63. Do you find, in the specifiation or drawing, any description or representation of the openings represented on the Fosket model No. 3, each side of the trunk, and through that face of the surrounding case? If so, refer to and quote the language of the specification giving such description, or name the part of the drawing which gives such representation.

526 A. The description of the portion referred to of the Fosket patent is in the following words: "A suitable passage or tube H leads from the vicinity of the bow-string to what may be termed as the forming or wind-chamber I; this latter being a square or circular box, of convenient dimensions, around and through the lower part of each of the sides of which various elongated orifices K are cut," etc. The machine represented in the drawing has a square box chamber, having four sides, and the tube H is much narrower than the side of the box at which it enters; if,
527 therefore, the elongated orifice at the lower part of this side of the box is as long as the elongated opening represented at the lower part of the side of the box shown in figure 2 of the patent, the tube being narrower will not fill up, and there will be left openings on each side of the trunk, as shown in the model. The proportions of the model 3 are not identical in every respect

with the proportions shown in the drawing attached to the patent, and in these drawings the wind-chamber is represented as supported upon blocks, and the tube or passage is represented apparently as made of sheet-metal, protected at each of its sides
528 where it enters the case or chamber, by blocks of wood.

X Q. 64. You have stated that in the Fosket machine "the mixed current of fur and air is impelled towards the section or portion of the circumference of the lower part of the conical former, by the joint agency of the impulse imparted by the disintegrating apparatus and the currents induced by the action of the exhaust;" will you quote that portion of the specification which states that the mixed current of fur and air is impelled to-
529 wards the cone by the disintegrating apparatus, or any agency other than the currents induced by the exhaust?

A. There is no statement in the specification in such express language. In using this language, I described the operation of the machine as I understood it. It is stated in the specification that the operation of the bow-string "produces the whipping or bow-string operation," etc., "similar to that usually effected by hand process," etc.; and in observing bowing by hand, in which case there is no exhaust or draft, I have noticed that the
530 fibres operated upon by the bow-string are caused to pass, or impelled from the place where the bow-string acts upon them, through the air to the place where they fall upon the hurdle; and I think this is a part of the whipping or bow-string operation referred to in the patent. It is also stated in the patent that the filaments "are drawn by the current of air which enters through the tube H," which drawing current is stated in the patent as being produced by the exhausting fan, and I have no doubt that in the practical operation of the machine the impulse im-
531 parted by the bow-string (which is the disintegrating agent) does act jointly with the current induced by the action of the exhaust to impel the mixed current of fur fibres and air in the trunk towards the cone.

X Q. 65. Have you ever—if yea, when and where—tried any experiment with a full size Fosket machine, and without the use of the exhaust, to see how far the action of the bow-string alone would carry the filaments of fur towards the cone?

A. I have never tried the experiment without the use of the exhaust, while the bow-string was driven by machiney, with
532 any intention of ascertaining the distance to which the fur would be projected by it alone when driven by machinery. I did one day vibrate the bow-string with my thumb, and noticed that the fibres went towards the cone, but I did not open the chamber and look into the trunk to see how far they went, nor did I notice that the chamber was open so that the movement of the fibres was not impeded.

X Q. 66. Is not the length of the delivery aperture of the trunk in the Fosket machine at right angles to the axis of the
533 cone, and the general plane of the trunk opposite the lower part or base of the cone only?

A. They are.

X Q. 67. Assuming the current of fur and air in the Fosket machine to be impelled alone by the bow-string, and that to have sufficient force to impel the fur fibres against the cone, would not the fur fibres be deposited upon the lower portion or brim of the cone only?

534 A. If it be also assumed that when the fibres strike against the cone they stick there, or are held there by some means, and that the cone is rotating at the time, the fur fibres would undoubtedly be deposited in the form of a belt upon the lower portion or brim of the cone only.

X Q. 68. In the Fosket machine is not the fur carried to and deposited upon the upper part and tip of the cone entirely by the force due to upward currents induced by the exhaust?

535 A. The fur is carried from the mouth of the trunk towards the upper part and tip of the cone by the agency of the upward current induced by the exhaust, and I think I so stated the fact in my direct examination.

X Q. 69. In testifying as to the Wells machine, in contradistinction to what has been called the Burr machine in examining other witnesses in this cause, you have stated that "the form of the delivery aperture of the trunk or chamber directs the fibres against a portion of the circumference of the revolving perforated exhausted cone, or a section of the circumference thereof
536 whose extent is defined by the adjacent lips or edges of the delivery aperture of the trunk." Did you mean by this to be understood that the fur delivered is deposited against a section of the circumference of the cone no wider than the delivery aperture of the trunk?

A. I did not mean to express such a meaning with reference to the extent of the deposit, but simply that the fur fibres are directed by the form of the delivery aperture of the trunk against a section of the circumference of the revolving perforated exhausted
537 cone, of the extent I mentioned, in contradistinction to the throwing of the fibres towards or against a revolving perforated exhausted cone, without their being directed by a trunk having a delivery aperture of the form required, as they are thrown, for example, in the Williams machine.

X Q. 70. Is it not in the power of the operator in the Wells machine so to control the operation, that during a portion of the time all the fur will be deposited on the brim of the cone, and none on the tip; and then on the entire length by having the hinged

hood depressed at first, and then gradually elevated towards the end of the operation?

538 A. I think that it is in the power of the operator moving the hood, and thus varying the form of the delivery aperture or mouth of the trunk during the operation of forming a bat, so that the fibres of fur will at one time be directed for distribution by the form of the delivery aperture or mouth of the trunk to the lower part of the cone only; and then by operating on the hinged hood to cause them to be directed toward the upper portion or tip of the cone, as well as the lower, by the change thus made in the form of the delivery aperture of the trunk.

539 X Q. 71. Is it not provided in the patent that this may be done either by the hand of the operator, or automatically by the mechanism?

A. In the descriptive part of the patent, the hood is described as being carried "up and down" by mechanism "to direct the discharge and distribute the fibres on to the cone;" and in the latter part of the patent it is stated "that the hood may be operated by hand instead of machinery."

X Q. 72. Cannot the diversity of the deposit of the fur
540 along the length of the cone be still further modified in the said machine by elevating or depressing the hinged flap at the bottom of the delivery aperture of the trunk?

A. It can in this machine.

X Q. 73. Assuming that the Wells machine were described in the patent without the hinged hood and flap, so that the deposit of fur could not be varied along the length of the cone without a modification of the trunk, would the addition of the hinged hood and flap be an addition or improvement of the original machine, or would such addition make the mode of operation of such ma-
541 chine substantially different?

A. If the hypothetical machine were constructed in the first instance with a trunk of rigid material, having a delivery aperture, or mouth, of the form adapted to direct the picked fibres for distribution upon the cone, so as to form a bat of the required variation in thickness at its different parts, the hinged flap and hood would not be necessary, and the operation of the machine, so far as relates to the production of a bat of the required difference in thick-
542 ness at its different parts, would be substantially the same; but there would be a difference in the order of the deposit, because when a hinged hood is used, as described in the patent, there is a variation in the delivery of the fibres while they are depositing. The absence of the hinged hood and flap would take from the hypothetical machine the capacity of adjustment, either for forming bats having a different variation in thickness at their different parts, or for being used to form bats upon cones of materially different shape and size to the one to which the delivery aper-

ture of the trunk was adapted by its constructor; and the
543 adaptation of a hinged hood and flap, constructed and operated as set forth in the reissued Wells patent, to a machine originally constructed with a rigid trunk, would give such a machine a capacity which it did not before possess, and would in this respect make it substantially different. So far as relates to the distribution of the picked fibres upon the cone, this distribution would in both machines be directed by the form of the delivery apertures or mouths of their respective trunks; and in this respect the
544 machines would be substantially the same.

X Q. 74. Would not the two machines, in the conditions specified in the last question, possess the capacity to deposit a streak of fur, upon the entire length of their respective cones?

A. The hypothetical machine, with the rigid trunk, as specified by me in my last answer, and the Wells machine with the hinged flap and hood, would both possess the capacity to deposit a
545 streak of fur upon the entire length of their respective cones.

X Q. 75. Would they not both do this by the same mode of operation?

A. If the hinged hood and flap of the Wells machine are not moved during the deposit of the streak of fur, the result would be attained in the two machines by the same mode of operation.

X Q. 76. By the addition of the hinged hood and hinged flap controlled by the operator, does not the machine acquire the additional capacity of enabling the operator so to control the
546 operation, that the machine will throw the streak of fur either upon the whole or a portion of the length of the cone, as may be directed by his judgment and skill?

A. The hinged hood and flap of the Wells machine do undoubtedly impart to that machine a capacity of adjusting the form of the delivery aperture of the trunk by the judgment and skill of the operator, when the machine is constructed in such manner that these parts can be moved by hand. And in this case
547 they enable the operator, by acting upon them, so to control the operation of that machine that the streak of fur would be deposited upon the whole or a portion of the length of the cone, according to his judgment and skill in manipulating these parts of the machine.

X Q. 77. Suppose in the Wells machine the position of the cone and the exhausting apparatus were so changed as to place the axis of the cone in a position parallel, or nearly so, to the axis of the picker, and the intermediate trunk so altered in shape
548 as to have its delivery aperture bear the same relation to the new position of the cone that it has in the machine as described in the reissued Wells patent, all other parts remaining the same; would the machine so modified be substantially like, or substantially different, in mode of operating, from the machine described in said reissued patent?

A. The hypothetical machine described in the question, as I understand it, would be substantially the same in its mode of operation with the specified Wells machine, so far as relates to
549 the formation of the bat. But in such a machine the cone would necessarily have to be secured to the exhausting apparatus or cone-stand, which mode of construction would be an exceedingly inconvenient one when used in connection with the Wells mode of hardening, described in the patent; and the cone would have to be attached and detached whenever it was applied to or removed from the machine, instead of being simply set upon the cone-stand; and in this respect the two machines would be substantially different, and the mode of operating the cone in
550 hardening would have to be modified.

X Q. 78. Could not the cone be readily attached and detached by the use of a simple spring-catch, such as is represented on the full size Cowperthwaite machine here present?

A. It could; but I do not think the attachment and detachment could be effected without stopping the rotation of the cone; nor do I think that the preparation of the bat for hardening, by the application of wet cloths, as described in the Wells patent,
551 could be used in connection with a cone so secured, without danger of injuring the bat.

X Q. 79. As an engineer, would you have any serious difficulty in placing three or more cones radiating from the cone-stand, and with the cone-stand swivelled to the case of the exhausting-fan on a horizontal axis, so that when a bat was formed on one cone, the cone-stand could be turned to bring such cone to a vertical or nearly vertical position, where the required appliances could be made for the hardening process, as described in the Wells patent; the shifting of one cone bringing another
552 cone in front of the trunk?

A. I have no doubt that after having had such a mode of construction suggested to me, and having seen an analogous cone-stand with cones on, as on the Cowperthwaite machine, I would have no difficulty, as an engineer, in constructing such a cone-stand.

X Q. 80. What would be the difficulty of making the required appliances to a horizontal cone, as in question 77, for hardening according to the description of Wells, after making provision for attaching and detaching as before named?

553 A. I think there would be a difficulty in applying the tip-cloth, and holding it in place until the cover was slipped over it. If this be not the case in practice, this difficulty would not exist.

X Q. 81. Having altered the Wells machine, as specified in question 77, and having ascertained that by the hinged hood and flap, as specified in the patent, by the skill and judgment of an

operator, the machine can be made to deposit the fur upon the entire length of the cone, or a portion thereof, would the substitution of the feeding of the fur by the skill and judgment of the operator to different parts of the length of the picker to obtain the same result, destroy the substantial identity of the machine as a mechanical combination?

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A. In the first case mentioned in the question, the skill and judgment of the operator must be exerted upon the hinged hood, and if necessary the flap, in order that the form of the delivery aperture of the trunk may be adapted to the required result; and if I understand the operation of the Wells machine, I think that a variation in the mode of feeding by the operator who feeds would not make a material difference in the distribution of the fibres on the cone, so as to obtain a bat of the required thickness at the different parts by the form of the delivery aperture or mouth of the trunk, whether the cone stand upright or horzontal, provided the trunk be properly adapted in each case to the position of the cone. I do not see, therefore, how the substitution of the feeding of the fur, by the skill and judgment of the operator who feeds, could in such a machine destroy the substantial identity of the machine as a mechanical combination, and, moreover, the hypothetical machine, as I understand it, would still contain the same combination of elements.

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X Q. 82. Does not the reissued Wells patent provide for making the form of the delivery aperture of the trunk correspond in shape to the form of the cone, so as to deposit an equal or nearly equal thickness of fur upon the entire length of the cone, and provide the hood, and hinged flap, and their operation for diversifying the thickness in the direction of the length of the cone?

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A. In my preceding answer I have used the words, form of the delivery aperture, or mouth of the trunk, as a convenient phrase to express the outline or perimeter of the orifice, through which the fur fibres issue in passing to the cone, including so much of the edges of the trunk proper as form part of this orifice, so much of the lip of the hood as forms part of this orifice at any time, and also the lip of the flap which forms the lower part of this orifice. I now understand the question to refer only to the orifice of the trunk proper, exclusive of the hood and flap; and this part of the machine is described in the patent as made "nearly of the form of the cone, but narrower and higher;" and I think such a form of the delivery aperture as described, and as shown in the drawing, without flap and hood, would probably direct the distribution of the fibres so that a bat would be formed thicker at the tip than towards the brim. The patent also states that the trunk is constructed in such a manner that its front end can be raised or let down by means of a set-screw, "to regulate the delivery end of the chamber relatively to

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559 the cone;" and such a mode of regulation, if carried to the extent provided for in the machine, as shown by the length of the set-screw in the drawing, would make a material difference in the distribution of the fibres, passing from the trunk to the cone, in the direction of the length of the cone. The patent, after describing the regulation of the delivery end of the chamber relatively to the cone, goes on to state: "Its forward end, in addition to this, is provided with a hinged flap, regulated by a cam lever, as a means of regulating the delivery of the fibres;" and
560 afterwards, when speaking of the hood, that, during the operation of the machine, the eccentric carries the hood up and down to direct the discharge and distribute the fibres on to the cone." The idea conveyed to my mind by the whole description taken in connection is, that the form of the delivery orifice (by which the fibres are directed for distribution) relatively to the cone may be varied during the operation of forming the bat by the movement of the hood, and that it may be adjusted at other times by the operation of the set-screw; and although there is no
561 specific statement as to the time when the hinged flap should be moved, its construction and the arrangement of its cam lever are such that the first may be moved while the machine is in operation, to vary the distribution of fibres towards the base of the cone.

[Adjourned from 3½ to 5 p. m.]

X Q. 83. Would not the Wells machine, modified as specified in question 77, without the hinged hood and flap, form a
562 bat of equal or nearly equal thickness along the straight parts of the cone in the direction of the length?

A. The hypothetical machine might or might not produce such a result. I have never had the opportunity of experimenting upon such a machine to find out the result.

X Q. 84. Would the interposition of the trunk between the picker and cone, in such a machine, prevent the sheet of fur discharged from the picker from lodging upon a section of the cone along its entire length?

A. If the orifice of the trunk of the hypothetical machine
563 were not moved laterally by the set screw in such manner as to prevent such a result, I think the result mentioned in the question would take place.

X Q. 85. Assuming the Wells machine to be modified as required by question 77, with the delivery aperture of the trunk properly adjusted to the cone, and the fact to be known that by the addition of a hinged hood the operator by his skill and judgment operating the hood can cause the fur to be deposited upon the entire length of the cone or upon a part of such length,
564 would the substitution, for the use of such hood, of the feeding of the fur upon the apron to a part of the length of

the picker, or of the whole length of the picker, to produce the result of depositing the fur either upon a portion of the length, or upon the whole length of the cone, destroy the substantial identity of the machine as a mechanical combination for forming hat bodies?

A. As I understand the hypothetical machine described in question 77, at the time that question was put, it contained the trunk, hinged hood, and flap—or, in other words, the delivery aper-
565 ture through which the fur issues to the cone, bears the same relation to the cone in that machine as it does to the cone in the Wells machine described in the reissued patent. In this case, there would be no necessity of adding the hood, as it already exists in the hypothetical machine. As I have before stated several times, I understand the operation of the Wells machine to be such that a variation in the feeding towards one side of the feed-apron or to the other produces no material change in the distribution of the picked fibres by the form of the delivery
566 aperture, or mouth of the trunk. Moreover the hypothetical machine, as I understand it, contains the same combination of elements as the machine in the reissued patent, so far as relates to the formation of the bat. I cannot see how, therefore, the feeding of the fur upon the apron to a part of the length of the picker, or of the whole length of the picker, would destroy the substantial identity of the machine as a mechanical combination for forming hat bodies.

X Q. 86. Question repeated.

A. I believe that I have answered the question, and have
567 no other answer to make.

X Q. 87. In the machine as modified in question 77, and without the use of the hood, if the fur be fed towards that end of the picker alone which is opposite the brim of the cone, will not the fur be deposited on the brim of the cone alone, or nearly so; and if fed to the entire length of the picker, will not the fur be deposited upon the entire length of the cone?

A. As I understand the modified hypothetical machine, the question supposes that the original hypothetical machine is
568 partly disorganized by the removal of one of the parts whose duty was to "direct the discharge and distribute the fibres on to the cone." I think that in this disturbed state of the machine the fibres would in both cases be deposited upon the entire length of the cone, but to what extent I cannot say, as I have never had the opportunity of making an experiment with such a machine.

X Q. 88. What part of the machine in that case would be removed?

A. One of the devices which forms part of the delivery aperture,

through which the fur issues in passing to the cone, namely,
569 the hood.

X Q. 89. If you take the machine, such as modified in question 77, and without the hood, and assume it to have been fed with the fur laid across the apron in equal or nearly equal thickness, to make a bat of equal or nearly equal thickness, along the length of the cone, would it destroy the substantial identity of the machine as a mechanical combination to feed the fur on to the apron either of unequal thickness from one side of the apron to the other, or to feed it at first only to that part of the width of the apron which
570 is opposite the brim of the cone, and then, as the operation progresses, across the entire width of the apron?

A. As I understand the question, it supposes the disturbed hypothetical machine to be fed in different ways, at different times, without any alteration of the machine, and I have no doubt in such case the mere variation in feeding would not affect the substantial identity of the machine as a mechanical combination.

571 X Q. 90. Does not the patent granted to Alva B. Taylor on the 12th August, 1856, before referred to in your cross-examination, provide for the feeding of the fur to the picker entirely across the width of the apron, but of greater thickness on that side of the apron opposite the brim of the cone, and gradually thinner towards the other side?

A. On looking cursorily over the patent I see no such statement. I find it stated that the improvement "consists in a method of regulating the distribution of the floculent fur upon the perfo-
572 rated cone, by varying the feed to the picking-cylinder;" and when I look further to see how this variation in the feed is to be effected, I find it stated that it is done "by distributing the charge of fur upon the feed-apron in such manner that there shall be more fur conveyed to that part of the picking-cylinder which delivers fur to the part of the perforated cone where the bat is to be made thickest; and on the other hand less fur is fed to that part of the picking-cylinder which delivers fur to the part of the perforated cone where the bat is to be made thin, and which is usually the head or tip." And I do not see that this lan-
573 guage of necessity implies the mode of operation stated in the question, and no other. Moreover I have great doubts whether the mode of operation mentioned in the question would enable the operators to produce a bat of the customary thinness at the tip when a small cone is used.

X Q. 91. Would the defendant's machine, called the Cowperthwaite machine, during this examination, (the one now present,) as a mechanical combination, if fed as specified in question 90,
574 be substantially different in its mode of operation from the same machine when fed as you have stated in your examination in chief you have seen the Cowperthwaite machine fed?

A. The mechanical combination of devices existing in the Cowperthwaite machine would not, in my opinion, be changed by a mere variation in the feeding, whether it be fed in the manner described in question 90, or in the manner I have stated that I saw it fed upon my examination in chief; but the mode of operation pursued with such a machine, if fed in the manner set forth
575 in question 90, if such a manner be practical, would be changed, and the mode in which the fur is deposited upon the cone, or the order of the deposit, would be changed; and I think in this respect there would be a substantial difference between the modes of operation pursued when the hypothetical mode of feeding is adopted, and when the Cowperthwaite mode of feeding is adopted.

X Q. 92. Have you not seen machines in operation in the city of Newark, New Jersey, in the establishment of Alva B. Taylor and Charles O. Jessup, constructed in accordance with the
576 description and drawings of the Alva B. Taylor patent, of August 12th, 1856, before referred to, with fur fed on the apron, as specified in question 90? And if such machines were not so constructed, specify in what particular they were otherwise constructed; and if not so fed, specify how otherwise they were fed.

A. I have already stated, I think, in my cross-examination, my recollections as to the machines referred to in the question, and that, without any notes to refer to, I could not specify the precise construction of the picking apparatus. In other respects I
577 think the said machines were like the machine described in the Taylor patent referred to. As regards the feed I cannot, at this time, and in the absence of my notes, state with certainty the precise mode of feeding; but I am pretty certain that the fur was not fed to the pickers entirely across the width of the apron.

X Q. 93. Do you not find in both the Wells and the Cowperthwaite machine, when in operation, that there is a sheet of disintegrated fur, thrown by a rotating picker which travels and finally impinges on a section of a perforated exhausted and rotating
578 cone, and that at the will of the operator this sheet of fur can be made to impinge upon the entire length of the said cone, or only on a portion of its length, and that in both the said machines this sheet of fur is impelled by the centrifugal action of a rotating picker, and so impelled until it is brought within the controlling action of currents induced by the partial exhaustion of the air from the inside of the cone?

A. I find that in both the Wells and Cowperthwaite machines there is a sheet of disintegrated fur thrown off by a rotating disintegrating cylinder, which in the first machine is a brush,
579 and in the Cowperthwaite machine is a toothed-cylinder,

technically termed a picker. I also find that the sheet of disintegrated fur in the Wells machine, when it reaches the cone, lodges upon a section of a perforated rotating exhausted cone of defined extent; and that in the Cowperthwaite machine, as I noticed it in operation, the fur thrown off by the picker appears to be lodging to a greater or less extent upon the whole circumference of the cone, or certainly upon a portion of that circumference, which is not defined in extent. I also find that in the Wells machine
580 the sheet of fur may be made to impinge upon the entire length of the said cone, or only upon a portion of its length, by the will of the operator, who operates a mechanical device for the purpose; and that in the Cowperthwaite machine the sheet of fur can be made to lodge upon the entire length of the cone, or only on a portion of its length, at the will of the operator, who places the fur upon the feed-apron in such manner that this result is effected. I also find that in both the said machines the
581 sheet of fur is impelled towards the cone partly by the centrifugal action of the rotating disintegrating device of each machine, and partly by the action of currents induced by the partial exhaustion of the air from the insides of the cones of the respective machines; and that in the Wells machine the currents induced by the partial exhaustion from the inside of the cone does not control the sheet of fibres proceeding from the picker, so as to cause it to impinge upon the cone in a manner different from what it would if the sheet was impelled by the action of the disintegrating apparatus alone; and that in the Cowperthwaite machine the cur-
582 rents induced by the partial exhaustion of the air from the inside of the cone, control the sheet of fibres proceeding from the picker, so as to cause it to impinge upon the cone in a manner different from what it would if the sheet was impelled by the action of the disintegrating apparatus alone; and that in both machines the sheet of impelled fur proceeding from the disintegrating apparatus is thrown within the action of currents induced by the partial exhaustion of the air from the inside of the cone.

583 X Q. 94. Is not the picking cylinder of the Cowperthwaite machine for the purpose specified a known mechanical equivalent for the picking brush, described in the reissue of the Wells patent, and are they not both named as equivalent instruments for that purpose in the said patent?

(Plaintiffs' counsel requests the witness to be as brief in his answer as he can consistently be, and plaintiffs' counsel, in making this request, states, in justification thereof, that by stipula-
584 tion the defendants' evidence must close to-night, and the examination of this witness in chief occupied the greater part of four days, and was only closed yesterday afternoon, leaving to plaintiffs' counsel but one day and one evening to cross so lengthy an examination.

The witness respectfully informs the counsel that he has always endeavored to make his answers as brief as the nature of the question in his understanding permitted, without rendering his answer liable to misconstruction, and that he shall hereafter con-
585 tinue to pursue the same course.)

A. It is a known mechanical equivalent of the brush for the purpose specified, and is substantially so stated in the patent referred to.

X Q. 95. What is it that defines in the Wells machine the extent of the section of the circumference of the cone on which the fur is deposited?

A. The form of the delivery aperture or mouth of the trunk.

X Q. 96. Have you not already testified that the delivery
586 aperture or mouth of the trunk does not limit the extent of the section of the circumference of the cone on which the fur is deposited?

A. I do not recollect having made a statement in this express language. I think I have stated that the form of the delivery aperture or mouth of the trunk directs the fibres for distribution against a portion or section of the circumference of the cone, whose extent is defined by the position of the adjacent edges of the delivery aperture of the trunk; and I understood the two preceding questions to refer to a case in which a sheet proceeding from
587 the disintegrating apparatus impinges upon the surface of the cone without the extent of its place of deposit being affected by preceding depositions of other fibres, or any other cause.

X Q. 97. Do you not know that in the Wells machine, when in operation, the sheet of fur when leaving the mouth of the trunk spreads out laterally, and is deposited upon a section of the circumference of the cone wider than the mouth or delivery aperture of the trunk?

A. I do not know this fact from personal observation, as
588 I have never seen to my recollection a Wells machine as described in the reissued patent in operation, and have never before been informed of the fact.

X Q. 98. What would be your opinion theoretically on that point?

A. In my opinion the sheet would not spread out laterally to any appreciable extent in places where the edges of the delivery aperture approximate closely to the surface of the cone; but
589 that, in those places where the edges of the delivery aperture recede from the surface of the cone, the sheet would spread out laterally to some extent, even when the deposition upon the cone is not effected or the perforations thereof partially closed by preceding deposits.

X Q. 99. Assuming that in the Wells machine, during every

part of the operation the sheet of fur, after issuing from the delivery aperture of the trunk, spreads laterally to an appreciable extent before impinging upon the cone, in such case would not the sheet of fur impinge upon a section of the cone by the joint action of the currents impelled by the picker, and the cur-
590 rents induced by the exhaustion of the cone?

A. In such case the impinging force would undoubtedly be the joint action stated in the question, and I think I have so stated the fact in my direct examination.

Adjourned to 11 a. m., on the 19th.

Monday, October 19th, 1857.—Counsel on both sides present.

X Q. 100. Is not the main purpose of the upper picker-roller in the Cowperthwaite machine to give direction to the current
591 of fur thrown by the two pickers, so that it shall be brought within the controlling influence of the exhaust cur rents?

A. The upper picker-roller of the Cowperthwaite machine has a two-fold purpose. One of these purposes is, to cause the current of fibres to pass towards the cone, so that it shall be within the reach of the currents induced by the exhaust, instead of returning over the lower picking cylinder towards the feed-apron, as it would do if the upper picker-roller was taken away.

592 X Q. 101. Is not the Cowperthwaite machine, as represented in defendants' Exhibits 10 and 11, so constructed that the upper picker-roller can be placed further forward, and so much further forward that a tangent common to the two pickers, if produced, would pass to the ends of the cone, or nearly so?

A. The construction of the machine is such that the upper picker-roller can be turned forward upon the axis of the lower one as a centre until, in its most extreme forward position, the common tangent of the two picking rollers, if produced, would, as
593 near as I can estimate, pass from two to two and a half inches over the axis of the perforated cone at the centre of the feed-apron; but if the upper roller be so placed a different fence from the one in the machine would have to be used, wide enough at its lower edge to stop the passage of fur over the upper feed-roller.

X Q. 102. Is not the fence in the machine simply a board cut to the required shape, and attached by two screws to the heads, in which are the journals of the upper picker, and fitted so
594 that one such fence can be taken out, and another of a greater width put in in a few minutes?

A. The statement in the question is correct, if there be another fence ready to put in.

X Q. 103. Would not the Cowperthwaite machine, with the

upper picker-roller set forward, as named in answer to question 101, and with a proper fence, work quite as well as when set, as you say it was set in the machine when you saw it in operation, as represented in Exhibits 10 and 11?

595 A. I have never seen such a hypothetical machine in operation, and cannot, therefore, speak from personal knowledge. I will give an opinion on the subject, if desired.

X Q. 104. Did you not describe such a hypothetical machine, as you call it, in preparing the specification in which letters patent were granted to Alva B. Taylor, dated July 29th, 1856?

A. The machine represented in the drawings of the patent referred to is shown with a cone and picking cylinders in such
596 relative positions; and I prepared the description in the patent.

X Q. 105. You have testified in your examination in chief, that when you stood by the Cowperthwaite machine, while the exhaust was suspended and the pickers in operation, the fur was carried beyond the cone, and mainly over it, only a small portion falling between the cone and the picker-frame, and that from this, and other circumstances, you concluded that the fur was collected on the cone mainly by the agency of the exhaust currents, or substantially to that effect. Have you experimented with a
597 Wells machine with the cone removed from its position directly in front of the mouth of the trunk, and placed to one side of the trunk, so that the trunk shall be tangential to the cone?

A. I have not.

X Q. 106. In the machine, as supposed in the last question, by what agency, in your opinion, would the fur be mainly collected on the surface of the cone?

A. In the said hypothetical machine, the current of fibres proceeding from the picker through the trunk would issue from
598 the delivery aperture thereof, directed for distribution, and would then be deflected laterally by the currents induced by the exhaust, which would be the main agency in causing the fibres to collect upon the cone.

X Q. 107. Would the fact that, in the Wells machine modified as specified in question 105, the fur is collected on the cone mainly by the agency of the currents induced by the exhaust, make a substantial change in the principle or mode of operation of the said machine?

599 A. The said hypothetical machine would still contain the same devices as the machine in the reissued patent, but the relative arrangement of the trunk and cone would be changed, so that the currents of fibres, although directed for distribution, would no longer be caused to impinge against a portion or section of the cir-

cumference of the cone of defined extent; and in this respect there would be a substantial difference in the mode of the operation of the hypothetical machine.

X Q. 108. Question repeated.

A. I think I have answered the question fully. I might
600 add what I deemed at the time unnecessary, that, in other respects, there would be no substantial change in the mode of operation of the hypothetical machine.

X Q. 109. Is the mode of operation of the Cowperthwaite machine, in your opinion, substantially changed when the upper picker-roller is thrown back so far that the tangent common to the two pickers, when produced, passes above the cone, from what it would be if the upper picker-roller were placed so far forward as that the common tangent would be in the plane of the axis
601 of the cone, or nearly so?

A. The question calls for an opinion with respect to a matter on which I have not the practical data to guide me. I have noticed that as the current of fibres leaves the pickers, it commences to spread laterally both upwards and downwards, as there is no mechanical device to keep it within bounds. If such a current moved towards the cone in the direction specified in the hypothetical case in the question, and were not impelled with sufficient force to disturb the deposits collecting upon the cone, I think
602 that the mode of operation of the machine would not be substantially changed so far as regards the resulting bat, as the fibres would still be collected upon an undefined extent of surface of the cone; but in this hypothetical case the currents induced by the exhaust would not be the main agents in causing the fibres to collect upon the cone, and in this respect there would be a substantial change in the mode of operation of the hypothetical machine.

(Answer objected to as being argumentative and not directly responsive to the question, and the witness is requested in
603 future to making no argumentative answers, as there is no court present to check the indulgence of such a propensity, and the short time allotted to the cross-examination of the lengthy examination in chief of this witness, already extended by consent of counsel, is too short to admit of doing justice to the plaintiff's case within the short time now left.)

X Q. 110. Would the spreading of the sheet of fur, as named in your last answer, be greater when the upper picker-roller is put forward, than when it is put back?

604 A. I think not.

X Q. 111. What in your opinion would be the effect, in the machine like model Exhibit B, of putting between the cone and the mouth of the trunk of a board of less width than said mouth, the said board being placed parallel to the plane of the end

of the trunk, or facewise thereto, and tapering in about the proportions of the mouth of the trunk, but narrower?

A. If I understand the proposition, it supposes that the delivery aperture or mouth of the trunk is partially obstructed by a
605 wedge-formed board, having its base as low as the bottom of the trunk, and its point extending upwards as high as the top of the trunk, thus leaving a wedge-formed space at each of its sides between the edges of its sides and the sides of the trunk, if produced towards the cone. In such a case I think that the resulting bat would have the same relative thickness at its different parts that it would have if the board were not there, provided the proportionate areas of the two wedge-formed spaces at different parts of their height were the same as the proportionate areas of
606 the delivery aperture of the trunk at the same parts of its height. If this proportionate area were changed, the relative thickness of the bat at its different parts would in my opinion be proportionately changed.

X Q. 112. With the machine with the board, as specified in the last question, as the same was understood by you, and worked without the exhaust, in your opinion would not the fur issue from the trunk laterally in two sheets, on opposite sides, without impinging on the cone; and if worked with the exhaust, would not the two sheets of fur pass out laterally, and bend around
607 the edges of the board, and thence travel to the cone?

A. The divided current would, undoubtedly, issue from the hypothetical trunk in two sheets, one at each of its sides; whether it would or would not impinge on to the cone when the exhaust is stopped, would, I think, depend upon the greater or less proximity of the wedge-formed board to the mouth of the trunk. I think it is very likely that in some positions of the board the two sheets would be deflected laterally to such an ex-
608 tent that they would not strike the cone, or at any rate would graze its surface; and in such case, if the exhaust were put in operation, the two sheets would be bent towards each other across the opposite edges of the board, by the currents induced by the exhaust, and thence travel to the cone.

X Q. 113. You have stated that the Williams machine, for making conical bats, might be altered to make it like a Wells machine in principle, or mode of operation, by placing the cone further from the disintegrating apparatus, and interposing a trunk with a suitable delivery aperture between the disintegrating apparatus;
609 and, also, that the said Williams machine might be altered to make it operate like the Cowperthwaite machine, by placing the cone nearer to, and its axis nearly parallel with the disintegrating apparatus. Does not the necessity for such change, in your opinion, show that there is a substantial difference in the

mode of operation of the said Williams machine and the said Wells', and between said Cowperthwaite machines?

A. It does, in each case, to the extent of those changes.

610 X Q. 114. Do you know in what space of time a hat body can be formed on either the Wells machine, or machine like model Exhibit B?

A. I do not, as I have never timed it.

X Q. 115. How long do you suppose it takes?

A. That must vary with the weight of the bat; I should suppose from 2 to 4 minutes.

X Q. 116. Were not the hat bodies formed an the Fosket machine, to which you have testified, and which have been put in evidence, made of coarse fur?

611 A. I do not profess to be an expert in practical matters relating the qualities of fur, and therefore cannot answer.

X Q. 117. Do you consider yourself an expert as to the quality of hat-bodies before they are made into hats?

A. I have had the means of comparing hat-bodies made in different ways, with a view to ascertain their relative thickness at different parts. I can also see whether they have thick or thin places, or holes in them, and whether they have sufficient consistency to enable them to be removed from the cones on which

612 they are formed; and, also, whether they are wet or dry. Further than this I do not profess to be an expert on this point.

X Q. 118. Does it not take much longer to form a hat-body of fine than of coarse fur?

A. I do not know from personal experience.

X Q. 119. Does it not require a cone of much larger size to form a hat-body of fine fur than of coarse fur?

A. I have been informed that it does, because a bat of fine fur shrinks more in sizing.

613 X Q. 120. You have testified that the Fosket and Wells machine are more alike than the Cowperthwaite and the Wells machine. Do you find in the Fosket machine a rotating picker or brush combined with an exhausted cone?

A. I do not; but I find in this machine a disintegrating apparatus combined with an exhausted cone.

(The latter branch of the answer objected to, as not being responsive to the question; and for the further reason, that

614 the witness has before stated, not only that the Fosket machine has a disintegrating apparatus and an exhausted cone, but has minutely described the construction, operation, and effect of the disintegrating apparatus.)

X Q. 121. Do you not find such combination of a rotating picker or brush, with an exhausted cone, both in the Wells and in the Cowperthwaite machine?

A. I find in the former a combination of a rotating brush, with an exhausted cone; and in the latter a combination of two rotating pickers, with an exhausted cone.

X Q. 122. In the Fosket machine do you find combined
615 with an exhausted rotating cone the means of impelling a sheet of fur fibres in a plane parallel, or nearly parallel, with the axis of such cone?

A. In the Fosket machine, I find that so long as the sheet of fibres remains in the trunk or passage, they are impelled in a plane perpendicular to the axis of the exhausted rotating cone, with which the impelling means is combined, and not parallel thereto. After the sheet of fibres leaves the trunk, the direction of the impelling means changes, so as to carry the fibres towards the
616 tip of the cone, and, in doing this, change the direction of the sheet of fur fibres to planes approaching parallelism with the said cone.

X Q. 123. At the time the sheet of fur in the Fosket machine issues from the trunk or passage, is it then parallel with or at right-angles to the axis of the cone?

A. At the moment it issues from the passage it is at right-angles to the axis of the cone.

X Q. 124. Do you not find both in the Wells and in the Cowperthwaite machine, combined with an exhausted ro-
617 tating cone, a means of impelling a sheet of fur fibres in a plane parallel, or nearly parallel, to the axis of the said cone?

A. I understand the words, "means of impelling," to express in this question, as they were explained to me by the counsel in reference to question 122, to include every agency of whatever kind or description, in either machine, by which the fur fibres are made to go from the disintegrating apparatus to the cone, on the broadest acceptance of these terms, and I do find in "both the Wells and the Cowperthwaite machines a means of impelling a
618 sheet of fur fibres in a plane parallel, or nearly parallel, with the axis of the cone." I may state that I do not consider the sheets of fur in the two machines as alike in section, or in their positions in other respects relatively to the cones.

X Q. 125. You have stated that the operation of the Cowperthwaite machine and the Williams machine are nearer alike than the operation of the Wells machine and the Williams machine.

(Adjourned to 5½ p. m.)

619 Could you on the Williams machine, without alteration, and simply by following the description and drawings, make merchantable hat-bodies varying in thickness from brim to tip, thickest at the brim and gradually thinner towards the tip?

A. I think that in the operation of the Williams machine, with-

out any manipulation on the part of the operators, the hat-bodies made would probably be a little thicker at the brim than at the tip, from the closer proximity of the brim portion of the cone to the exhaust. Other than this, there is nothing stated in the description, or shown in the drawings, for producing bats differing in thickness at their different parts; and I do not think that the bats formed without manipulation would have as great a difference in thickness at their brim and tip as those I have seen made for the trade.

620

X Q. 126. Does not the fan of the disintegrating apparatus discharge the fur in a sheet at right-angles to the axis of the cone, in the Williams machine?

A. I think it does so discharge it in a sheet of considerable thickness; I think it does so discharge it, at the very instant of discharge.

621

X Q. 127. Do you find in the said Williams machine any means other than the exhaust, and the force of gravity, to cause the fur fibres to deposit on the cone?

A. The fur fibres must be impelled in a direction towards the cone by the disintegrating apparatus. When this is done there is no other means, than the exhaust and the force of gravity, to cause the fur fibres to collect upon the cone.

X Q. 128. Is not the fan which throws the fur fibres in the Williams machine placed higher than the tip of the cones?

622

A. It is so represented in the drawings in reference to the cone on the machine. But the rim or wheel upon which the cone sets, appears to be large enough to receive a cone whose top would extend upwards about as high, or nearly so, as the lower side of the fan in the English drawings. In the American drawing the largest cone that could be used, having the same taper as the one on the machine, could not extend up so high.

623

X Q. 129. Do you find anything in the specification, or in the scale of the drawings, which indicate that the cone represented is not of the largest size for making hat-bodies?

A. It is stated in the English description that "on the top of this box E there are other lesser openings upon which are placed any required forms, as for example *b, c,*" etc.; from which I infer that the forms shown in the drawing are simply examples of those that can be used, without any restriction as to size or shape, provided they can be placed upon the machine; and as hats in that day must have necessarily been of different sizes, they must of necessity "required" different size cones to make the bats upon. There is no scale on the drawings, but the rim or wheel on which the cone sets appears to me to be large enough to receive cones of larger size than that shown in the drawing.

624

X Q. 130. Have you not stated that the fur is deposited upon

the form which for the time being is nearest to the fan of the disintegrating apparatus; and that, when the bat is formed on that one, the case is turned around, to bring the next form in place?

In view of such statement, and the drawings in the English
625 patent, could a cone be used which would come up to the level of the under part of the fan without striking against the frame, which extends below the fan?

A. I have stated that I believe that to be the mode of operation of the machine. The question whether so high a cone as that mentioned in the question could be so turned, would depend upon the space or distance between the cheek-pieces of the frame. If

these be wide enough apart, a long tapering cone may be
626 turned upon the machine, which would not otherwise pass under the cheek-pieces. If the cheek-pieces be close together, the cone must necessarily be short enough to pass under them in turning, and consequently could not be as high as the lowest side of the fan.

X Q. 131. Assuming the machine to be worked with a cone of the proportional size represented in the drawings, and assuming the fur to be deposited upon the cone nearest to the fan, which part of the cone will receive the thickest layer of the fur, the

tip or the brim, as that machine is described and re-
627 presented?

A. I think that at the commencement of the operation the fur fibres would collect the most rapidly at the tip; but that as the operation progressed, and the perforations at the tip became partially obstructed by the accumulation of fibres, a larger proportion of these would pass towards the brim of the cone; where, as I stated before, the draft is probably stronger from its close proximity to the opening leading to the fan; and I think the

resulting bat, as I stated before, would probably be a little
628 thicker at the brim than at the tip.

X Q. 132. Without the exhaust on, which part of the cone would the greatest quantity of fur be deposited—the tip or the brim; assuming the fur to possess some adhesive quality, which would make it adhere to the surface of the cone on which it falls, and keeping in view the position of the cone relatively to the fan, as represented in the drawing?

A. That is a very difficult question to answer; as that machine appears to be constructed, it is difficult to say, without experiment,

what would be the extent of the impelled current when not
629 deflected towards the cone by the exhaust. I do not know that my opinion, under such circumstances, would be reliable, but I think that the probability is that a greater quantity of fibres would stick fast to the upper portion of the cone, in the hypothetical case mentioned.

X Q. 133. Will not the currents induced by the exhausting-fan,

that travel towards the apertures at the tip of the cone from the fan, be in a more direct line through to the inside of the
630 cone than the currents going to the apertures near the base; and if so, in view of the relations of the parts represented in the drawing, will not a greater thickness of bat be formed at the tip than at or about the brim of the cone?

A. I think the statement in the first part of the question is correct, but I do not think the conclusion is necessarily so, because the quantity of fibres carried to and collected upon any part of the cone depends upon the force or strength of the currents, as well as their direction; and, as I have stated before, I believe the
631 currents at the brim of the cone will be the stronger.

X Q. 134. Do you find in the said Williams machine any means described or represented by which the machine can be made to vary the thickness of the bat in the direction of the length of the cone, at the will of the operator?

A. I find no express statement to that effect in the description, but, as I said before in the preceding part of my examination, in substance, the construction of the machine described and
632 represented is such, that I believe that bats varying in thickness in the direction of their length can be made on such machine at the will of the operator.

X Q. 135. Specify the means by which such results can be produced?

A. By the skill, judgment and manipulation of an operator at the cone, who should, with his hand, from time to time, during the formation of the bat, strip off progressively smaller belts of fur fibres from the tip of the cone downwards, as it is rotated, and return the portions stripped off to the operator at the feed-apron?

633 X Q. 136. Do you find in the Williams machine for making hat-bodies a rotating brush or picker, combined with a rotating exhausted cone?

A. I do not find in that machine either of the particular kinds of rotating disintegrating apparatus, specified in the question, combined with the rotating exhausted cone.

X Q. 137. Do you find in the Wells reissue of October 7th, 1856, that it is there described that the invention of Wells consists in the special mode of hardening the bat, as therein
634 described?

A. The language of the patent conveys to my mind the impression, that the invention of Wells is restricted to the hardening of the bat by means of hot water; but that it is not restricted to the special means of applying that hot water, or, in other words, the hardening of the bat must be done substantially as described in the specification.

(Answer objected to, for the reason that the witness has assumed

to himself the province of the court, namely, giving the construction to the claim of the patent, when the question called
635 upon him to answer as to what is described.)

X Q. 138. Question repeated.

A. It was my impression that the question called for such an answer as I gave. But from the objection of the counsel it appears I have inadvertently been in error. I will now state, that in the preamble of the patent the following words occur—"the hardening of such bat;" and when I examine the descriptive portions of the specification, to find out what the hardening is, I find no other mode of hardening than that by hot water
636 described or suggested. Moreover, I find it stated that "the preparation of the formed bat for hardening is effected by covering it with pieces of felt or fulled cloth, just taken from hot water," etc.; and I find no other mode for preparing the bat for hardening described; and these passages which I quote are, in my understanding, a description that the invention of Wells consists in the special mode of hardening the bat, as I understand the meaning of that language in the question.

637 (Answer objected to, as not being responsive to the question, and the witness is again requested to dispense with the arguments, and to observe that the question assumes that there is a special mode of hardening described in the patent, and that)—

X Q. 139. He is asked whether the invention, as described in the patent, consists of such special mode of hardening?

A. As I now understand the question, it is not described in the said patent "that the invention of Wells consists in the special mode of hardening the bat as therein described," taken by
638 itself.

X Q. 140. You have testified that the invention of Wells, in hardening, in said reissue of October 7th, 1856, appears to be the discovery that the bat may be hardened sufficiently to enable it to be removed from the cone upon which it is formed, by saturating it with simple hot water. Do you find it stated in any part of the patent, that Wells was the first to discover that simple hot water would harden a bat sufficiently to admit of handling it? and if yea, quote the language of the specification which
639 conveys such idea to your mind.

A. The question which called forth that answer was restricted in its language to the "means" of giving "sufficient consistency to the bat," and the latter part of that answer was called forth by a verbal suggestion of the counsel for the defendants. In answer to the present question, I now state that it is not "stated in any part of the patent, that Wells was the first to discover that simple hot water would harden a bat sufficiently to admit of handling it," as stated in the question.

X Q. 141. Calling your attention to the patent of Ste-
640 phen Hurlburt, will you state whether that patent is not for hardening hat bodies on the cone, which body has been formed by winding a web of fur thereon, and not for hardening a body which has been formed on a cone by depositing the fibres thereon?

A. It is stated in the only paragraph of the patent which is not claim, that it is "a new and useful improvement in the manufacture of hats, by hardening a body on a cone." The claim mentions the formation of the body by winding, but I do not see that
641 it restricts it to the mode of forming by winding.

X Q. 142. Do you find any mode of forming a body other than by winding a web on the cone described or suggested in that patent?

A. I find no other mode of forming a body described or suggested in the claim; and no particular mode of forming mentioned in the remaining part of the patent, or described or suggested therein.

X Q. 143. Do you find in the Williams patent, published
642 in the 10th vol. of Newton's Journal, page 73, referred to in your examination in chief, that any of the articles to be manufactured by any of the machines therein described, after being saturated in the adhesive composition, or any other, are to be afterwards felted; but on the contrary, do you not find therein described that such articles so manufactured are to be in contradistinction to articles manufactured by felting?

A. To the first branch of the question I answer, that I do not find any statement that the articles manufactured are to be
643 afterwards felted in that description; and to the second branch of the question, I find it stated simply in that description that the "new combinations of fibrous materials is in contradistinction to the present mode of" "felting."

X Q. 144. Calling your attention to the following consecutive passages from the specification of the Williams application for an American patent of 1840, "when a sufficient quantity of the
644 fibrous material has been deposited upon one shape and form, another shape made in two halves, (when its form requires it,) as that shown at figure 7, is placed over the material and the inner form, and the whole removed together and dipped into the adhesive composition, (generally of weak size, or a solution of shellac,) which saturates it. The material thus combined is taken from the forms and dried. If the forms for hat-bodies are required for felting, they are removed to another machine, where they undergo the process of basoning or hardening, whilst between the
645 forms." From the foregoing is it not evident that the forms saturated in the adhesive composition, of which a solution of shellac may be one, are not intended afterwards to be felted?

A. I do not think that the language quoted, taken by itself, of necessity implies the fact stated in the latter part of the question. I think that it may imply that they are basoned or hardened whilst between the forms, either after they are dipped in the adhesive composition, or without their being dipped in the adhesive composition.

X Q. 145. Do you find in the Blanchard patent referred
646 to in your examination in chief, any description or statement that the bats are to be hardened on a cone?

A. I do not.

X Q. 146. Do you find in the patent of Wells, published in the London Journal, vol. 13, to which you referred, any description of forming hat-bodies by depositing the fur on the exhausted cone?

A. I find no description of such a mode of operation.

X Q. 147. Have you seen any hat-bodies which were
647 formed on the Fosket machine hardened on the cone, and removed therefrom in a suitable condition for being made into good hats by following none other than the description of the process of hardening contained in the said patent?

A. It is stated in the patent that the filaments pile or overlay each other upon the gauze frame, "upon which they are to be pressed, and upon each other, by revolving conical rollers, or other proper contrivances. The process is thus carried on until a sufficient quantity of the fibrous material to form the hat body is deposited upon the conical gauze frame, which is after-
648 wards to be removed therefrom and felted and treated in the usual manner." I have seen hat bodies formed upon the Fosket machine, in which the fibres did pile and overlay each other upon the gauze or grass cloth, and upon which they were pressed, and upon each other, by a revolving conical roller. The process was carried on until a sufficient quantity of the fibrous material to form the hat body was deposited upon the conical gauze frame, which was afterwards removed therefrom. In the machine that I saw the conical roller jiggered endwise, and the tip of the bat was patted by hand, and these two things I do not find
649 stated in express words in the patent.

X Q. 148. Do you find them described in terms that are not expressed?

A. I think the words "other proper contrivances" is a direction to the user to employ any proper contrivances known in the art for the purpose in view, although there is not in the description, in so many words, the supplemental means stated in my answer.

X Q. 149. Are not the words which you have quoted,
650 namely, "or other proper contrivances," indicative that other contrivances may be substituted for conical rollers?

A. I think that they are indicative that other proper contrivances may be used than conical rollers, which simply revolve, or "revolving conical rollers," as stated in the patent.

X Q. 150. Did you see the tip of any of those bats hardened by conical rollers in the said Fosket machine?

A. I did not.

X Q. 151. Were not the sides of the bats hardened on
651 that machine by a conical roller which both vibrated longitudinally and on its axis?

A. They were.

X Q. 152. Do you find in the said Fosket patent any instructions or description directing that the roller, or any roller, for acting on the bat fibres deposited on the cone, is to have a vibratory motion?

A. I do not.

X Q. 153. Do you find in the said Fosket patent any description of or direction for further hardening the bat on the
652 grass cone, as an inlayer, after its removal from the cone-frame, preparatory to the removal of the bat from the said grass cone?

A. I do not.

X Q. 154. Look at model No. 6, and say whether the perforated forms therein represented are not placed proportionately at a greater distance from the vertical plane passing through the axis of the fan of the disintegrating apparatus than represented in the drawings of the Williams patents.

653 A. They are a little further off, and, as nearly as I can see, the extra distance from that plane is about equal to about half the diameter of the cylindrical part of the hat-shaped former on that model.

E. S. RENWICK.

Sworn to before me this 13th day of October, 1857.

654 R. E. STILWELL,
U. S. Com'r.

UNITED STATES OF AMERICA,
Southern District of New York,
City, County, and State of New York, ss.

655 Be it remembered, that on this fifteenth day of October, in the year of our Lord one thousand eight hundred and fifty-seven, I, R. E. Stilwell, a commissioner, duly appointed by the circuit court of the United States, for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes
656 depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish

the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, No. 9 College Place, in the city of New York, in the said southern district of New York, in the State aforesaid, John S. Rice, to testify and the truth to say, on the part and behalf of the defendants, in a certain suit or matter of controversy, now de-
657 pending and undetermined, in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants.

And the said John S. Rice, being about the age of 39 years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said John S. Rice, and he did thereupon depose, testify, and say as
658 follows, viz:

Q. 1. What is your name, age, residence, and occupation?

A. My name is John S. Rice; age 39 years; residence in Newark, N. J.; and a foreman in a hat shop in Newark, and have been in the hat business about 22 years.

Q. 2. Are you acquainted with the process of making
659 hats by hand, and also that by making them by machinery?

A. I am, by both processes; that is, by the Burr machine and by hand.

Q. 3. What effect has the immersion of the bat in hot water on the hat, as practised with the Burr machine?

A. It has the effect to hold it together some, but not enough to felt it.

Q. 4. Have you seen a Fosket machine at work? If so, state where.

A. I have; at 83 Duane street, New York.

660 Q. 5. Who was present at the time you saw it work?

A. I believe Mr. Mills was present at one time; Mr. E. Renwick, Mr. Brown, and Mr. Burns, and Mr. Cowperthwaite.

Q. 6. Did you see hat bodies formed on it while you were there?

A. I did.

Q. 7. What is the character of the bats you saw formed, and how did they compare in texture and relative thickness of parts with other bats?

661 A. I saw some several formed; I saw two formed on the grass-cloth over the cone; those were hardened by the roller, and taken off the cone with the grass-cloth inside the bats, then hardened in the usual manner with the linen cloth; I saw some several others formed on the metal cone, hardened with a roller after the hat was formed, a cap put over, then taken from the machine and hardened between a cone and a cap; the cap was taken

off, and the bat was hardened some more in a linen cloth, in the usual way; this bat was hardened between the bat and the
662 cone, by a motion of the cones.

Q. 8. Did you size any bats which you saw made; what trouble had you in sizing them, if any, and what was their condition after being sized?

A. I did; I sized two that were formed on the grass-cloth, and I had no difficulty in sizing them; they worked well, and made a good hat, and the hats are here to show for themselves. [The witness produced two hats, marked Exhibit 12 and 13.] Those were formed in Mr. Renwick's presence; I had two others sized in my presence, which I saw formed; those two *was* formed on
663 a cone without any grass-cloth, and the cone put over, as I have before described. [Witness produces two more bodies, marked 14 and 15.] I consider that those all will make good and perfect hats.

Q. 9. Were these hats, referred to in your last answer, formed in the presence of Mr. Renwick?

A. They were.

Q. 10. What was its character and texture in these bats as compared with other bats, and how did they compare with other
664 bats as to the thickness of tip and brim? I refer now to the character before they were sized, and as you received them after they had been formed.

A. They were as well formed as any bodies we have of the same mixture of stock. They were well proportioned in tip and brim.

Q. 11. Did you try any experiment to ascertain the effect of immersing a bat in a heated mixture of size, after it had been formed on a cone, and before it had been hardened in any way? and
665 if so, state fully what the experiment was.

A. In the first place I saw bats formed without any hardening process whatever; then there was a cone put over the bat of a similar size to the one which it was formed on; the bat and cone was taken off the machine. We then made a preparation of glue and starch dissolved, and put it into a tub two-thirds full of boiling-hot water; then the cones with the bat between them were immersed in the tub of hot water, the cone with the tip downwards, so that it would let the air out, and wet gradually; and after
666 it was thoroughly wet and saturated through with the size, the cones were then taken out, the cap-cone taken off; the bat was then removed from the cone, and the size wrung out in a cloth. The bat was then hardened in the usual manner by linen cloth. Those three bats I sized, and I have them here and sized them myself, and I consider them as well formed and proportioned bodies as I ever saw. [Witness produces the three bodies, 16, 17, and 18.]

Q. 13. In trying this experiment, had you before you any printed

description; and if so, could you identify the same, if it was
667 shown to you?

A. I saw a printed description, and could identify the same if shown me.

Q. 14. Please examine the printed description, in the following words: "the best adhesive," and ending with the words "general are," on pages 75 and top of 76 of Newton's London Journal, vol. 10, and state whether that is the description that was before you at the time you tried the experiment.

A. That is the description I had before me, and we took about one-half pound of glue and dissolved it in cold water and three
668 ounces of starch, and mixed them in this tub of hot water; that those bats were immersed in that I referred to above. We afterwards added more glue as we replenished the hot water to be used for more bats; the glue was of thickness enough to make the water very sticky—not so as to have an effect on the fur. For holding together I think the glue would be an improvement in felting and in matting the fur together.

Q. 14. What trouble, if any, had you in working these bats after you removed them from the cone and the size?

669 A. No more than we would any hat.

Q. 15. What was the usual number of hat bodies made a day by the old hand process by a single man?

A. From 8 to 12 might be an average.

Cross-examined by Mr. Keller, Counsel for Complainants.

X Q. 16. In what shop are you employed as foreman?

A. Samuel Leeds'.

X Q. 17. What experience have you in making hats by what you call the "Burr machine?"

670 A. I have had charge of a shop for the last 2 or 3 years in Newark. I have given the hats out to the hands and received them in.

X Q. 18. Have they any Burr machines in the shop of which you are foreman?

A. No, sir.

X Q. 19. What do you mean by saying you have experience in making hat bodies by the Burr machine?

A. I have worked those bodies myself, and also have to
671 superintend the making of them.

X Q. 20. Have you ever formed hats on the Burr machine?

A. I have never formed any myself, but have seen them formed.

X Q. 21. When did you first see the Fosket machine in operation?

A. I believe the first time I ever saw it was last Saturday.

X Q. 22. Was it like model No. 3?

A. That appears to be the principle of it.

X Q. 23. How many times, in all, have you seen that
672 machine work to form hat bodies?
A. About three or four.
X Q. 24. How long a time did it work on each occasion you see it at work?
A. Some several hours some days.
X Q. 25. About how many hours in all, including all occasions, have you seen it?
A. About twelve, more or less.
X Q. 26. When you saw hat bodies formed on the ma-
673 chine, were the tips hardened at the same time that the sides of the bats were hardened?
A. The tip would not require but very little hardening, being a small amount of stock in the tip.
X Q. 27. Question repeated.
A. They were.
X Q. 28. By what means were the sides hardened?
A. The sides were hardened by a roller.
X Q. 29. Did the roller work on the fur during the whole time that the fur was being deposited on the cone?
674 A. It did.
X Q. 30. What worked on the tip while the roller was hardening the sides of the bat?
A. By patting the hand on the tip a few times will harden the tip.
X Q. 31. How did you get your hand inside the case to tap the tip whilst the fur was being deposited on the cone?
A. We would open the door far enough to admit a man's arm.
X Q. 32. Did not that interfere with the depositing the
675 fur on the cone?
A. All that I saw formed it did not.
X Q. 33. Did you keep the door open all the time that the bat was being formed?
A. No, sir.
X Q. 34. The bats that were formed on the grass-cloth covering the cone-frame, how were they further hardened after they were removed from the cone-stand?
A. They were hardened in a linen cloth.
X Q. 35. Was this hardening in a linen cloth done before the grass-cloth was taken out of the bat, or after?
676 A. Part of it before, and the other part after.
X Q. 36. Was not the grass-cloth, during a part of this hardening, used as an in-layer?
A. It was.
X Q. 37. Calling your attention to the bats that were formed on the metallic cone, how were they hardened?

A. They were partly hardened while forming, with a roller, and afterwards taken from the cone and hardened in a linen cloth.

677 X Q. 38. How were the tips hardened?

A. The tips were hardened between the two cones, the same as the sides. I should have said in my previous answer there was a previous hardening between the two cones previous to the hardening in the cloth.

X Q. 39. After the bat was formed, was not an outer cone put over the bat before the exhaust of the machine was suspended?

A. It was put on after the exhaust was suspended.

X. Q. 40. Then it was put on after the sides of the bat

678 had been hardened by the roller—is that so?

A. It is.

X Q. 41. How many hat bodies, in all, were made on that machine, both on the metal-cone and the grass-cloth, that were afterwards sized into good hat-bodies?

A. All that I sized were perfect hat-bodies, and the others that I saw formed were also perfect; I saw from one to two dozen; there might have been more than that.

X Q. 42. What was the height of the cone on which it was formed, and its diameter at its base?

A. I did not measure the cone.

679 X Q. 43. Were they not all made on the same sized cone?

A. I am not certain as to whether they were or not.

X Q. 44. Were not all that you sized made on the same sized cone?

A. I sized at two different times, and I didn't notice whether they were of a different size or not.

X Q. 45. Did they differ materially in size?

A. There might have been some two inches difference in size, and I not notice them.

X Q. 46. Was it about the size of the cone present?

680 (One of the outer cones of the Cowperthwaite machine shown to witness.)

A. A larger cone.

X Q. 47. Do you mean larger in diameter at the base and higher, or simply larger at the base?

A. Larger at the base, and higher too.

X Q. 48. State, as near as you can, about how much larger.

A. About 4 inches higher, and some 4 inches larger at the base in diameter; it might be more or less.

681 X Q. 49. Are not the hat-bodies which you have produced, and made on that machine, such as are generally used for blocking into low-crowned hats?

A. They will make either.

X Q. 50. Question repeated.

A. As they are now, the hat-body, 18, is worked into a high crown, and the remainder low crown.

X Q. 51. Do you mean as a hatter, that in giving directions for making high or low crown, fashionable or broad brims, that
682 they are to be all made on the same size and shaped cone?

A. I do not.

X Q. 52. Do you not know that you receive many hat bodies made on the Burr machine, that were formed on cones much higher than the cone on the Fosket machine, when you saw it work?

A. I have seen some formed higher.

X Q. 53. Did you not work down the tips of the hat bodies which you produced here, more in proportion than in sizing hat bodies made on the Burr machine?

683 A. I worked them about the same as I have worked them on the Burr machine when the bodies were formed in the same proportion.

X Q. 54. Are not all the bats which you have produced made of very common fur?

A. About a middling quality.

X Q. 55. When did you for the first time felt a bat of fur fibres which had been saturated with a solution of glue and starch?

A. I have used some similar preparation in a kettle, and sized bodies and hats in it. I don't recollect when first—a number
684 of years ago, it might be ten or fifteen years ago.

X Q. 56. In whose establishment, and who was present when you used such preparation?

A. I cannot recollect the persons who were present. I think the man's name in whose establishment it was, was John N. Butts.

X Q. 57. Where was the establishment?

A. Providence, R. I.

X Q. 58. As near as you can tell, how long was it since
685 you used size in the kettle, as you have testified, in Butts' establishment, and for what purpose and by whose direction?

A. It's between ten and fifteen years ago since I worked there, and I can't say by whose directions it was put in. I might have done it myself; it was put in for the purpose of benefiting the hats that were sized in the water.

Q. 59. How old were you when that was done?

A. In the neighborhood of 25 years.

X Q. 60. What did you find to be the effect of using size on that occasion?

686 A. The general appearance or feeling of the body or hat would be better.

X Q. 61. Have you ever used it since in any establishment? and if so, name the establishment.

A. I have used it in two different establishments within the last five years; one was Elverson & Co., Newark; the other at Leeds' hat shop, Newark; the last time I used it is about one year ago.

X Q. 62. Why did you not use it all the time, if you found it to have a beneficial effect?

687 A. All the hats didn't require it.

X Q. 63. What was the peculiarity of the hat that required it?

A. Sometimes we use it because we want a hat a little light, stiff.

X Q. 64. Is not the starch or sizing washed out before the hat is finished?

A. It is not all washed out.

X Q. 65. Then do I understand you that you put it in
688 that the hat might be stiffened by its presence when completed? and if not, specify for what other reason you did put in.

A. It had a tendency to fill up the pores of the hat, and also to have a light, stiff hat, according to the quantity put in; those hats got up in that manner do not require any other kind of stiffening.

X Q. 66. Is there any portion of the glue and starch which was used in hardening in Exhibits 16, 17 and 18, now present in those bodies, or was it all washed and pinned out before they were subjected to the sizing process?

689 A. There was a considerable quantity of the size in them after they were wrung out, and there is a portion in them yet.

X Q. 67. How many times have they been dipped in hot water, and squeezed out, since they were taken out of the size?

A. That is rather a difficult question to answer; the number of times they are dipped in is probably 2,000 or 3,000. They are not wrung out, or pinned out, until they get nearly into size.

X Q. 68. If the presence of the glue and starch sizing
690 causes the fibres to felt together better, why did you not size those bodies in that sizing compound?

A. The stock that was in them shrunk sufficiently fast without putting in any sizing in the kettle where they were sized.

X Q. 69. How long did it require to saturate the body in this glutinous compound, and to take it off the cone?

A. I did not notice the time; I should judge from two to five minutes; it might be less.

X Q. 70. Where did you find the instructions for the
691 proportion of the water, glue, and starch used in the experiments?

A. I found the proportion of the glue and starch, or flour, in this printed slip, and the proportion of water Mr. Mills had used, and made some preparations previously, and used about the same proportions that he did about that time.

X Q. 71. Do you think that if you had saturated the bats with the solution you have made with rosin or pitch mixed with it, and then permitted the bats to dry, that they would have been in a fit

692 or suitable condition for sizing after the well-known mode of felting?

A. I don't think that they would have been in a proper condition, as the pitch or rosin would not mix in the water, unless going through a certain process of dissolving the pitch and tar, and then I could not answer for the effect it would have on them, as I have never tried that experiment.

X Q. 72. When you saw the Fosket machine in operation for forming hat bodies, did not some of the bodies made on that
693 machine require to be stopped off?

A. Some of them very little, and others none at all. Those last three that I saw formed and dipped in that solution of size did not require any stopping throughout the making of them.

X Q. 73. Did not the others require to be stopped off in consequence of holes or thin places being left in the bat?

A. No more so than others I have seen formed on other machines.

(Answer objected to as not responsive to the question,
694 and as voluntary.)

X Q. 74. Question repeated.

A. I saw some that was stopped off a little, and others were not stopped off any; some were and some were not.

X Q. 75. If some required to be stopped off, was it not because they had holes or thin places at the tip when the hat was being formed?

A. I saw some that had thin places, and some stopping put on.

X Q. 76. Question repeated.

695 A. That is what the stopping is required for, to stop the thin places, if there is any.

Direct resumed.

Q. 77. Do you ever have to stop off bodies which have been formed on the Burr machine; and if so, how often?

A. I have stopped them off, and had them stopped off; sometimes we have lots which are stopped off, probably one-quarter, and other lots would not require any.

696 Q. 78. What proportion of the bats formed in the Fosket machine required to be stopped off?

A. I sized five, and I didn't put any stopping on at all in all I sized.

Q. 79. What proportion of those you saw formed required to be stopped off?

A. It might be one-quarter or one-half; that stopping was before they went to the kettle.

Q. 80. How many have you seen stopped?

697 A. I don't think I have seen over 3 or 4 stopped: about three.

Q. 81. Where was the cone with the bat on, at the time the cover was put over it—inside the chamber or removed from it? I have not referred now to the experiments with the size.

A. It was removed from the chamber.

Q. 82. How many unsuccessful attempts, if any, did you see made with the Fosket machine, to form hat bodies?

698 A. I did not see any, unless it was when the power had stopped, and left the hat half formed.

Q. 83. Have you ever received hat bodies formed by the Burr machine, on cones smaller than the cone you saw in the Fosket machine?

A. I have.

Q. 84. How did you cause the shape of 18 to be given to one bat, and the shape of 17 to be given to the other; what was the shape when you commenced to work them?

699 A. They were both the same shape and size when I commenced them. I wanted to see if they wouldn't make one for a high-crown, and the other for a low-crown hat. This difference is caused—one we work more on the side for the high-crowned hat, and the others I intended for that; I could make either.

Q. 85. How long did it take to form a single hat body or bat on the Fosket machine?

A It took from five to seven minutes of those that I saw.

Q. 86. Did the machine run continuously during all the

700 12 hours which you say you saw?

(Objected to, as assuming that the witness has testified that he saw the machine work for 12 consecutive hours, which is not according to his testimony.)

Question modified.

Q. 87. Did the machine, during each of your visits, run constantly in making hat bodies, or did it stop?

A. It did not run constantly, but made some stops. It stopped part of the time.

Q. 88. Of what was the starch composed, which you used

701 in the experiment?

A. Composed of flour.

Q. 89. What consistency was the size which you used—I mean to the touch?

(Objected to as not being responsive to any new matter called out upon the cross-examination.)

A. It was of consistency enough to be very sticky, when you put your hand on the cone after the bat was off.

Cross-examination resumed.

702 X Q. 90. How many gallons of water in all did you use in connection with the quantity of glue and flour, or starch, which you have named?

A. I should judge from 10 to 18 gallons.

X Q. 91. What kind of vessel did you use this liquid in?

A. In a common wash-tub.

X Q. 92. Was it of sufficient depth to immerse the entire cone?

A. It was not.

703 X Q. 93. How then did you saturate the bat?

A. We saturate it by putting the cone and the bat tip downwards, then turning it around until it was all saturated.

X Q. 94. Did you use a watch for ascertaining the length of time which was required for forming the bat and for hardening it on the Fosket machine?

A. I did not myself.

X Q. 95. Are not the bats usually stopped off by the man who hardens, and not by the man who sizes?

704 A. That is the general rule; usually by the man who hardens.

X Q. 96. If the bat is thinner in some places than others, cannot the man who sizes equalize the thickness by working up the thin parts, and in that way, by proper skill, make a good hat body out of an imperfect bat?

A. He can, unless it is very uneven.

X Q. 97. When you say that you have seen hat bodies made on the Burr machine, do you mean to be understood as saying that you have seen them made on a machine like model Exhibit

705 E, with a hinged hood on the delivery end of the trunk?

The counsel for the defendants says that it is understood that the machine to which the witness refers as the Burr machine is a machine similar to that described in the Burr and Taylor patent.

JOHN S. RICE.

Sworn to before me this 15th day of October, 1857.

R. E. STILWELL,

706 *U. S. Com'r.*

UNITED STATES OF AMERICA,
Southern District of New York,
City, County, and State of New York, ss.

707 Be it remembered, that on this 17th day of October, in the year of our Lord one thousand eight hundred and fifty-seven, I, R. E. Stilwell, a commissioner, duly appointed by the circuit court of the United States for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the

708 more convenient taking of affidavits and bail in civil causes

depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, No. 9 College Place, in the city of New York, in the said southern district of New York, in the State aforesaid, Francis C. Treadwell, jr., to testify and the truth to say, on the part and behalf of the defendants, in a certain suit or matter of controversy now de-
709 pending and undetermined in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants. And the said Francis C. Treadwell, jr., being about the age of 33 years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said Francis C. Treadwell, jr., and he did thereupon depose, testify,
710 and say as follows, viz:

Q. 1. What is your age, residence and occupation, and what opportunities have you had of becoming acquainted with the principle of mechanism, and analyzing inventions or machines?

A. I am 33 years of age; reside in New York city; and am engaged in soliciting patents before the Patent Office; I have, all my life, been engaged in or connected with mechanical business; I have constructed and superintended the construction of
711 several original machines, and am patentee. I have been engaged in drawing specifications, and analyzing inventions, preparatory to application for letters patent; therefore, I have testified as expert in patent cases.

Q. 2. Have you paid any attention to the subject of hat body manufacturing? and if so, state what.

A. I have been familiar with the method of forming hat bodies, by machinery, for several years, and have paid considerable attention to machines for that purpose; I have also seen bats or
712 bodies formed by hand, and various branches of hat manufacture.

Q. 3. Have you examined the large Cowperthwaite machine now present, and did you hear the testimony of Messrs. Brown, Raymond and Robinson, as to the mode of forming and removing hat bodies, practised by Cowperthwaite, at Danbury; and do you understand the mode of operation of said machine, and said mode of removing bats?

A. I have examined the machine, and heard the testi-
713 mony of the witnesses referred to, and believe that I understand the machine, and the mode of operation described by them.

Q. 4. Have you examined, and do you understand the Wells

reissued letters patent, of September 30, 1856, and also of October 7, 1856?

A. I have read the patents referred to, and examined the drawings and models, and believe that I understand the same.

Q. 5. What, in your opinion, is the principle or characteristic feature of the said Wells patented machine, of September 30, 1856, so far as relates to forming bats?

714

A. The use of a peculiar trunk or passage-way, with a variable mouth or opening, in combination with a disintegrating and disseminating apparatus and revolving perforated exhausted conical or other shape form.

Q. 6. What, in your opinion, is the principle or characteristic feature of the Cowperthwaite machine so far as relates to forming of bats?

A. The principal characteristic feature of the Cowperthwaite machine is, that the cone is brought in very close proximity with the disintegrating apparatus, and placed horizontally in such a position that the fur passed through the disintegrating apparatus shall be deposited on the cone at a point opposite to the place where it is fed to the pickers.

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Q. 7. Are the said Cowperthwaite machines and the said Wells patented machines substantially the same or different in principle or mode of operation?

A. In my opinion they are not substantially the same in principle or mode of operation.

Q. 8. What in your opinion is the distinguishing feature of the Wells patented inventions of Oct. 7, 1856?

716

A. It consists in wrapping the bat with damp cloths while on the exhausting cone, and before placing the perforated cap or cover thereon, and the additional fact that the water in which the bat is immersed does not contain or is not purposely impregnated with any other substance.

Q. 9. What is the feature of the Cowperthwaite mode of removing the bat, and state whether the said Cowperthwaite and said Wells process of removing the bat is substantially the same or different in principle?

717

A. In the Cowperthwaite machine the bat is hardened by friction and pressure, and loosened from the cone, when in the third position on the cone-stand, and without the cone being removed from the cone-stand, and without being subjected to the influence of wet or moisture, and is when removed therefrom, the fibres forming the bat having been partially felted together. In my opinion the two processes mentioned in the question are substantially different.

Q. 10. State whether or not the distribution of the fibres on the

cone, in the said Wells machine, as to relative thickness of
718 brim and tip, depends upon the method of feeding.

A. In my opinion no change can be effected on the Wells machine by any alteration in the method of feeding in the line of deposit referred to in the question; the operation of the machine, so far as it controls the distribution of the fibres deposited on the cone, is exclusively confined to the fibres after they have been disintegrated and disseminated in the air within the trunk.

Q. 11. State whether or not the distribution of the fibres
719 on the cone in the said Cowperthwaite machine, as to relative thickness of brim and tip, depends on the method of feeding.

A. It does depend upon the method of feeding; the greater the relative quantity fed to the pickers the greater will be the amount deposited on the cone opposite to the point of feeding.

Q. 12. Refer to the tenth volume of Newton's London Journal, p. 75 to 78, also to the specification of Williams' application for an American patent (an exhibit in this case,) and state whether, in your opinion, with the knowledge so obtained, it would
720 require any, if so, what, invention to use the conical former, in combination with a picker, and give your reasons.

A. In the Williams English invention, referred to in vol. x, Newton's Journal, and in the application for American letters patent, referred to in the question, there is described a combination of revolving perforated exhausted forms, with a disintegrating apparatus, which, it is stated, may consist of a devil, or a picker, without opposition teeth, combined with feeding and pre-
721 senting apparatus, for the purpose of forming bats suitable for hat-bodies, and with all the directions contained in the publication and application referred to; I think it would not require invention to use the conical form in a horizontal position in connection with a disintegrating apparatus.

Q. 13. What change would it require in the Williams machine, described as aforesaid, to convert it into the Wells patented machine?

A. It would require the introduction of the peculiar trunk described in the Wells patent, with its variable mouth between
722 the disintegrating apparatus and the cone, so that the delivery of the fur fibres should be controlled by it, in the manner I have before stated.

Q. 14. What change would it require in the Williams machine, described as aforesaid, to convert it into the Cowperthwaite machine, so far as relates to forming the hat-body?

A. It would require the cone to be placed horizontally in close proximity to the pickers.

Q. 15. Please state whether or not you find in the said Cow-

perthwaite machine, any equivalent to the trunk and vari-
723 able mouth of the Wells machine?

A. I find no equivalent in the Cowperthwaite machine to the peculiar trunk described in the Wells reissued patent, or to any trunk, or to any variable mouth of a trunk, or to any device whatever, for regulating the distribution of fur fibres on a revolving surface, or a moving perforated surface, after the said fibres are disintegrated or disseminated into the air; and I find no device by which the operation of distributing or controlling, or varying the deposit of fur fibres in any manner, can be made; the same
724 being only effected by the method of feeding the fur to be disintegrated, to the pickers.

Q. 16. What change would it require in the mode of hardening the bat as described by the said Williams aforesaid, to make it the same in principle with the Wells patented process, as aforesaid, so far as relates to hardening the bat?

A. In the Williams inventions referred to, it is stated that the conical bat may be enclosed by a cone surrounding it after it is formed, and may then be removed and dipped, and im-
725 mersed in fluid of such consistency as would thoroughly penetrate the bat. The cap or outer cone is then taken off, and the body removed from the inner cone while wet. The only change observable in Williams' process of hardening, referred to in this description, and the Wells process, is the exclusion of the substances described by Wells from the water in which the bat is immersed, and the interposition of damp cloths between the bat and the outer cone; there is, also, another mode of hardening the bat while dry, by friction and pressure on a cone, which is
726 not in any respect like the process described by Wells.

Q. 17. Please refer to the specification of Williams' American specification, in connection with the last clause of your answer, and see if your memory is strictly correct.

A. The specification does not state, as I supposed, that in the basoning process, as applied to hat-bodies, that they were dry.

727 *Cross-examined by Mr. Keller, Counsel for Plaintiffs.*

TUESDAY, *October 20th*, 1857.

[Counsel on both sides present.]

X Q. 18. How long have you been engaged as a solicitor of patents?

A. About six months.

X Q. 19. You have stated that you have been all your life engaged or connected in mechanical business; will you state
728 what kind of mechanical business you have been so engaged in?

A. My father and uncle having made some inventions and im-

provements in machines for the manufacture of biscuits, left the mercantile business, which they were engaged in, and entered into the business of such manufacture for the purpose of carrying out their inventions. At an early age I entered the establishment with my father for the purpose of collecting bills, and also assisted a mechanic whom he had employed in the construction and
729 repairs of the various machinery used in the business. Afterwards I carried on the business myself for some years, and during that time reorganized, reconstructed, and adapted the machinery for the use of steam-power, and during that time I also constructed several original machines and other contrivances for carrying on that business; and since the time I left the business I invented and constructed a machine to be used in that business, which I patented about eighteen months ago, and since which time ten of them have been sold. During the time I was
730 engaged in my business, and before and since, I have read many mechanical works. I have examined a great number of machines used in various branches of business, and their mode of operation, and made myself thoroughly acquainted with the resources, tools, and other means used by machinists in the construction of machinery. I have also been in the habit of making working-drawings for machinists, and overseeing the practical carrying out of the same.

X Q. 20. Have you been engaged in the construction of
731 machinery other than for the business of manufacturing crackers and bread?

A. I have never been personally engaged in the construction of other machines, but have constantly been in machine-shops while employed in the construction of my machines, where other machinery was being constructed, and have observed the progress of the work from the time the drawings were made until it was finished, and I have frequently been consulted in reference to the same.

X Q. 21. Will you state in what patent cases you have
732 testified as an expert, and whether you were so examined in open court in equity suits on final hearing, or simply by ex parte depositions?

A. I made an affidavit to be used ex parte on a motion for an injunction against the American Elastic Cloth Company, in which I was engaged as an expert by the defence, for whom Mr. Keller, the present examining counsel, was of counsel. I also was examined before a commissioner or referee in a case in which a patent was involved, but the parties to which their names I have
733 now forgotten, on the part of the defence, in which Mr. George Gifford was counsel. I was also examined in open court in the United States circuit court for the southern district of New York, in a case which involved some cracker machinery, up-

on the principles and mode of operation of the same, on the part of the defence, by Mr. George Gifford, Mr. Keller being of counsel for the plaintiffs, and Mr. Stoughton acting in the trial of the cause. I was afterwards called on the second trial of the cause, but the line of testimony being decided to be inadmissible
734 by the judge, I did not testify. I do not recollect any other cases in which I have testified.

X Q. 22. Will you state what has been the extent of your practical experience in the business of manufacturing hat-bodies by hand, and by machinery, and where such practical experience in such business has been acquired by you?

A. I have no practical knowledge of the manufacturing of hat-bodies by machinery, or in other ways.

X Q. 23. In answer to your 5th interrogatory in chief
735 you have testified that the characteristic feature of the Wells machine, described in the reissue of Sept. 30th, 1856, is the use of a peculiar trunk or passage-way, with a variable mouth or opening, in combination with a disintegrating and disseminating apparatus, and a revolving perforated exhausted conical or other shaped former. Will you refer to and quote the language of the specification of said patent which gives such definition of said invention?

A. The answer from which the language in the question
736 is quoted was in response to interrogatory five, which called for my opinion as to the "principal" characteristic feature of the said Wells patented machine of Sept. 30, 1856, so far as relates to forming bats; and my answer expressed my opinion as to what was the characteristic feature of the said machine without reference to the patent, but with reference to other machines and parts of machines that I have examined, or the descriptions of which I had read.

X Q. 24. Will you now refer to the specification of the said reissued patent, and state what is in your opinion the characteristic feature of the invention therein described, and quote
737 the language of the specification on which you rely for such opinion as you have expressed?

A. I have referred to the said patent, and do not find therein set forth as the characteristic feature of the invention the said trunk, &c., as described in my answer referred to, but from reading the whole description, and from the knowledge I have of other machines, I do not see any other new and distinguished feature in the machine represented by the specifications and drawings
738 than the said peculiar trunk, with its auxiliaries, which I have referred to in my answer to interrogatory 5.

X Q. 25. Do you not find in the said machine of Wells, when in operation, that a sheet of fur is impelled towards the perforated exhausted cone in a plane approaching the said cone parallel, or

nearly parallel, with the axis thereof, and which is thus brought within the influence of the currents of air in use, by the exhaustion of the air from the inside of the cone, and that by mechanism or by the skill of the operator such sheet of fur may be made
739 to impinge upon a portion of or the whole length of the said cone?

A. I find in the machine of Wells, referred to in the question, that fur fibres, after they have been disintegrated and disseminated in the air, in the trunk or that portion of the trunk nearest to the disintegrating apparatus, are borne along through the trunk by a current of air generated by the disintegrating apparatus, and partially induced by the attractive current from the cone, which current of air and fibres is made to assume the shape of the trunk as it passes along through it, and finally issues from the trunk
740 in the shape and direction imparted to it by the mouth of the said trunk, and is collected or deposited upon the perforated surface of revolving exhausted conical or other shaped former, in a line from the base to the apex of the same, or to a portion of that line, as the aperture of the trunk may be shaped or conformed in length to the size of the cone by adjustment; I find that the operator may use the hinge hood for the purpose of adjusting the opening in the same way and same manner as it may be effected by machinery, the difference being merely (substituting the attention, skill, and cost of an operative for
741 the positive regularity and cheapness of mechanical movements.)

(Answer objected to by plaintiff's counsel as argumentative and not responsive to the question.)

X Q. 26. Question repeated.

A. I find that the plane of the current, when it issues from the mouth of the trunk, is parallel to the axis of the exhausted cone; but when it leaves the disintegrating apparatus it is at right-angles with the same.

742 X Q. 27. Question repeated.

A. I do not find in the said machine of Wells, when in operation, that a sheet of fur is impelled towards the perforated exhausted cone, approaching the said cone in a plane parallel, or nearly parallel, with the axis thereof; but I do find that it assumes that plane before it reaches the cone from a horizontal plane; and I do find that the current is brought within the influence of the currents of air induced by the exhaustion of air from the inside of the cone, and that by mechanism, or by the manipula-
743 tion of the operator, such sheet of fur can be made to impinge or collect upon a portion or the whole length of the said cone.

X Q. 28. Assume that in the Wells machine the exhausted cone instead of being in a central position, is placed in a horizontal po-

sition, with its axis parallel to the axis of the picking-brush, and the trunk so modified in shape as to adapt its delivery aperture or mouth to the new position of the cone, all other things remaining as in the description of the patent, except the cone-cover
744 and exhausting apparatus being adapted to the new position of the cone; would the said machine, so modified, be substantially changed in principle and mode of operation?

A. As I understand the question, it assumes the length of the trunk and the relative proportion of the delivery aperture of the same to that part in which the fur is received from the disintegrating apparatus, and the distance between the cone and the picker to be the same as described in the Wells patent. I see no change in principle or mode of operation in the hypothetical
745 machine proposed in the question, other than that it dispenses with the necessity for converting the horizontal plane of fur fibres and air to a vertical plane, as shown in the patent, so far as regards forming a bat.

X Q. 29. In the Cowperthwaite machine in operation is not a sheet of fur impelled in a plane parallel, or nearly parallel, to the axis of the rotating exhausted cone, until it is brought within the influence of the currents induced by exhausting the inside of said cone, so that such sheet of fur can, by the skill of the ope-
746 rator, be made to impinge upon a portion or the whole length of the cone?

A. I have never seen the Cowperthwaite machine operate; but I have examined the machine, and have heard the testimony of several who have testified as to its mode of operation.

(Plaintiffs' counsel objects to the witness testifying as to any hearsay matter, and is requested to limit his answers to matter within his own knowledge.)

A. I cannot answer as a matter of fact, within my own knowledge, the question; but if the counsel will assume a mode
747 of operation, I will express my opinion, or I will state what I think the machine is designed to accomplish. I mean so far as relates to the question.

(Plaintiff's counsel states to the witness that he cannot, in his question, assume any mode of operation, as the purpose of this branch of the examination is to ascertain what, in his (the witness's) opinion, is the principle or mode of operation in the defendant's machine; the question under consideration being one of a series of questions intended to call out the judgment of the
748 witness on this branch of the controversy.)

X Q. 30. Question repeated.

A. In the Cowperthwaite machine the fur fibres are impelled in a plane parallel, or nearly parallel, to the axis of the rotating exhausted cone, and in a line tangential to the upper surface thereof, until they are brought within the influence of the current induced

by the exhausting apparatus, and collected upon the surface of the cone. I do not find that "such sheet" can be effected or changed from the direction or shape in which it leaves the pickers,
749 before being deposited on the cone, by the skill of the operator, or directed within those limits at the will of the operator to any other portion of the cone, except that opposite to the part of the pickers which it proceeds from; but I do find the skill and judgment of the operators may be exercised so as to regulate the order of deposit by the manner in which the fur is presented to the disintegrating apparatus.

X Q. 31. If a hood such as described in the Wells patent were hinged to the frame of the Cowperthwaite machine, at the
750 end of the picking-rollers opposite the tip of the cone, could not the operative, by moving the said hood in the plane of the sheet of fur and towards and from the base of the cone, direct the current of fur impelled by the picking-rollers, so as to cause such fur to deposit mainly towards the brim of the cone, or upon its entire length?

A. I think that from the close proximity of the picking-cylinders to the cone that it would be impossible to put on such a hood as is indicated in the hypothetical question of a length great enough to effect at all the deposit of the fur fibres proceeding from
751 the pickers opposite to the base of the cone. If the hood were short enough to swing in between the tip of the cone and the pickers, and should be swung in as far as it could go, it would then enclose entirely and cut off the fur proceeding from about one-third the length of the picker-rollers, beginning at the point where the hinge of the said hypothetical hood is supposed to be placed, and the action in that position of the hood would be, if any, to make a cross current of fibres; but the said hypothetical hood, if swung so as to extend in a line from a point just
752 outside of the tip of the cone to the end of the picker-rollers, and if the hood should be large enough to take in the upper and lower picker-rollers, and leave space sufficient for the air to pass between, I don't think that there would be any sensible effect produced upon the greater part of the whole surface of the cone in the line of the travel of the fur fibres and in a line describing the extreme upper surface of the cone; but I think the fur fibres from the extreme end of the picker-rollers would be shot by the tip of the cone and by the inducing current of the exhaust collected behind the cone. I think that if the hinged hood were vi-
753 brated with considerable vigor or violence, it might produce considerable disorganization of that part of the current of fibres in immediate proximity.

X Q. 32. What is the necessity in the Cowperthwaite machine for placing the cone in very close proximity with the disintegrating apparatus?

A. By reason of the close proximity of the cone to the disintegrating apparatus, the fur fibres impelled from the pickers are not liable to be affected by disturbing forces until they come within the sphere of action of the exhaust current proceeding to-
754 wards the cone, and are by it arrested and attracted to and collected on the surface of the cone.

X Q. 33. Is it not that the sheet of fur proceeding from the picker shall more surely be deposited upon a section of the circumference of the cone?

A. I have no doubt, for the reason given in my last answer, that the fur fibres proceeding from the pickers will be carried with greater certainty within the sphere of the arresting and retaining exhaust current, and deposited upon the surface of the cone,
755 than if the distance between the pickers and the cone was much greater; but I do not see that the proximity of the pickers to the cone has in the Cowperthwaite machine the function or capacity of determining what space the fur deposited shall occupy upon the surface of the revolving cone.

X Q. 34. Do you not find, both in the Cowperthwaite and Wells machines, a rotating picker or brush in combination with a rotating exhausted cone?

A. I find in both machines the devices mentioned, operating in conjunction; and, so far, the combination is the same in
756 both machines.

X Q. 35. In both do you not find that the sheet of fur which is impelled approaches the said cone in a plane parallel, or nearly parallel, with the axis of the said cone, until it comes within the controlling influence with what you have termed the retaining and holding currents in use by the exhaust?

A. I find that the plane of the current proceeding from the Cowperthwaite machine is parallel with the axis of the cone, but I find the plane of the current proceeding from the mouth of the
757 trunk of the Wells machine, if produced, would be identical with the axis of the cone.

X Q. 36. Suppose you set the upper pickers of the Cowperthwaite machine so far forward that the tangent common to the two picker-rollers, if produced, would pass through the axis of the cone, would it materially change the mode of operation of such machine?

A. I don't know that it would change the mode of operation of such machine, except that the force of the impelled current of the fur fibres would be apt to disarrange and interfere with the de-
758 posit of fur fibres which had previously collected upon the cone, and were then collecting, and thus destroy the completeness of the resulting bat.

X Q. 37. Have you read and examined the letters patent granted

to Alva B. Taylor on the 29th of July, 1856, for improvement in machinery for forming hat bodies?

A. I have looked at the patent referred to, but I have not read it through or carefully examined it.

X Q. 38. Do you not know that the said patent described
759 the construction and operation of a machine identical with the Cowperthwaite machine now present, with the upper picking roller capable of adjustment, so that it can be set further forward, and so far forward as that the tangent common to the two picker-rollers, if produced, shall pass through the axis of the cone, or nearly so?

A. I find in the drawings attached to the patent referred to, the picker-rollers represented in the position as near as I can judge in the position indicated by the question. I think from a cur-
760 sory examination that the machine represented in the drawings is in the main substantially like the machine now present, but I think that if the upper picker-roller, as represented in the drawings, was set back, as far as it appears in the machine now present, that the fence represented in the drawing behind said roller may be wider than in the machine now present; that is, in that position it might extend further over the upper picker-roller than in the machine now present.

X Q. 39. Calling your attention to question 36 and your
761 answer thereto, state whether the disarrangement of the fibres, referred to in your said answer, would be due to the fact, that the line of travel of the current of fur fibres impelled by the picker-rollers in the position in the said question defined would be in direct lines from the pickers to the surface of the cone.

A. I think that the disarrangement of the fibres on the surface of the cone in the position referred to in the question, would be due to the force of the impelled current of fibres, and in my answer to the question thirty-six, I assumed that a force which
762 might be used safely when in a line tangential to the cone, could not be used so safely when directly impinging upon the cone.

X Q. 40. Would altering the force or velocity of the current of fur fibres change materially the mode of operation of the machine?

A. I do not know that in that respect, that the machine or the operation of it would be substantially changed, confined within the limits of the question.

X Q. 41. Do you not know that in the Wells machine as
763 described in the patent, and as usually operated, the fur fibres impinge directly against the surface of the cone, as they would in the Cowperthwaite machine with the picker-rollers set as defined in question 36?

A. I do not think that in the Wells machine, constructed and operated as described in the patent, that the fur fibres would im-

pinge with such force, or with force enough to disarrange the surface of the bat, nor do I think that they would impinge in the same manner as they would in the Cowperthwaite machine, adjusted as described in question thirty-six, because the variable mouth or opening of the trunk would cause the current of the fur fibres to assume a different shape from that which would proceed from the pickers in the machine referred to in question thirty-six.

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X Q. 42. Question repeated.

A. I think the fibres will impinge directly against the cone in both machines referred to in the question.

X Q. 43. If, as you say, they will impinge directly on the cone in both machines, why will such impingement disarrange the fibres previously deposited in one machine and not in the other?

765

A. Because I think the impelling force used in the Cowperthwaite machine, adjusted as referred to in question 36, might be relatively greater than the retaining power of the exhaust.

X Q. 44. Why do you assume that the impelling force might be relatively greater than the retaining power of the exhaust in the Cowperthwaite machine, adjusted as in question 36?

766

A. Because I suppose that the power required to impel the current of fibres in the surrounding open air to the cone, must be greater than the force exercised by the exhaust upon that part of the cone upon which the fibres would impinge, for the purpose of retaining them in position.

X Q. 45. Will it require more force to impel the fur fibres to the cone in the Cowperthwaite machine than in the Wells machine?

767

A. I do not know that it will, but the impelling force is exercised through a greater distance in the Wells machine, and I should suppose that the attractive force of the current to the cone would exercise a greater influence in carrying along the fibres to the cone in that machine.

X Q. 46. In the Cowperthwaite machine, set as in question 36, will not the currents induced by the exhaust, about that part of the cone on which the fur is being deposited, travel in the same direction as the impelled current of fur and fibres, so that they will act together, and in the same direction, for the two-fold purpose of causing the fibres to impinge upon the cone, and there to hold them; and if so, how can the impelling current disturb the fibres already deposited?

768

A. The impelled current does move in the same direction as the exhaust current in the machine, as described in question 36, and if they shall be nearly equal in force, then of course there would be no disarrangement of fibres; but if the force of the impelled cur-

rent should be greater, the effect would be the same as if a force were exerted to carry a piece of iron through the air, so that it would impinge against the surface of a magnet, whose at-
769 tractive power is sufficient to hold it. Another piece of iron might be impelled by the same force, so as to dislodge the first piece from its position, and occupy the same.

Adjourned from 4 to 5½ o'clock.

X Q. 47. Will not the fibres be held to the surface of the cone by precisely the same force which is depositing other fibres over them in the Cowperthwaite machine, as in question 36; and if so, how can the fibres that are being deposited disturb those already deposited?

770 A. I have already said, that I thought that if the impelling and exhaust turrents were nearly equal, there would be no great disarrangement of the fibres so deposited; but I now add, that so far as inertia could effect the operation, perhaps there might be some disturbance of the particles of fibres already collected on the cone, by the fibres coming to the cone, and if, at the commencement of the operation of so depositing fur fibres upon the cone, the force of both combined currents should be sufficient, the fur fibres might be deflected from the surface of the cone on
771 which they would strike, and not be held at the point they first came in contact with the cone.

X Q. 48. If, as you have already stated, the exhaust and the impelled currents are travelling towards the surface of the cone at that part of the surface where the fur is being deposited, are not the fibres already deposited there held by the joint force of both currents?

A. I think that the exhaust has the most to do with holding it there, because, as the cone revolves, the action of pressure
772 against the surface of the cone would tend to peel off the deposit.

X Q. 49. As the impelling current is travelling directly against the surface of the cone, against which the fibres already deposited are held by the pressure of the air, and the surface of the cone itself is too rigid to yield either to the force of the current of air or to the inertia of the particles of fur which are being deposited, will you please explain the rationale by which the fibres that are being deposited can disturb those already deposited?

A. The fibres that are on the cone are in a state of rest,
773 and inertia, so far as it can operate in fur fibres, is exercised in the moving fibres.

X Q. 50. Have you ever seen any machine in operation for forming hat bodies in which any of the fibres already deposited were disturbed by the deposition of other fibres?

A. In the machines I have seen in operation the currents were so regulated as not to cause disturbance.

X Q. 51. What machines have you seen in operation, and by what means did you ascertain that the currents were so
774 regulated as to avoid the disturbance of a fibrous deposit?

A. I have seen machines similar to the model Exhibit B in operation, and did not observe the disturbance of the fibres, and therefore conclude that, in the organization and construction of the machines, the currents are so regulated as not to produce disturbance when the impingement takes place upon the cone.

X Q. 52. Do you know if there would be any difficulty in so adjusting the relative forces of the impelling and exhaust
775 currents as to give the preponderance to the exhaust current in any of the machines named in your testimony on cross-examination, or any of the modifications thereof, which have been referred to?

A. I think there would be no difficulty in insuring a preponderance of the exhaust current in any machine where the exhaust current is produced by mechanical means, which is the case in the machines referred to.

X Q. 53. Do you find in the Williams invention described in vol. 10 of the London Journal, or in the Williams Ameri-
776 can patent of 1840, or in the description and drawings in the application therefor, a description or representation of a machine for forming hat bodies having a combination of a rotating picker or brush, with a rotating perforated exhausted cone? and if yea, quote the language of the description or descriptions, and refer to the figure or figures, of drawings which describe or represent such combination.

A. I find in the American Williams application a description of rotating picker with a perforated cylinder, and a statement
777 that any other form may be placed in the situation of that cylinder, and "that the fibrous materials may be deposited upon and consequently take the form of the various woven wire gauze or perforated shapes or plates;" "therefore any other form may be placed in the situation of the cylinder *i;* but in this case it is not necessary to enclose the forms in casing, as shown in the preceding figures, and the delivery rollers k k are not required."

X Q. 54. Does not the description of the machine for forming hat bodies in the Williams application referred to in your
778 last answer, follow the parts of the description to which you have referred?

A. It does, but prefixed to the part of the specification which I have "quoted is for the manufacture of hat bodies, and other irregular forms. I generally use the following arrangement of machinery and process, first remarking that it will be evident;" then follow the quotations I have before made.

X Q. 55. Does not the description then proceed to describe by a reference to figure 6 of the drawings the only machine
779 which he does describe for forming hat bodies? and state whether in such description or drawing you find the combination named in question 53; and if not, state why you did not so answer to that question.

A. The description does proceed to describe the machine. He says in his specification, "I generally use;" but it is not the only description, in my opinion, contained in the application, because I regard that part of the application which I quoted, taken in connection with the previous description in which cylinder *i* was combined with a rotating picker, as a description of a machine
780 on which hat bodies could be made, and I therefore so answered.

X Q. 56. Is not model No. 7 a representation of the machine in which he states that cylinder *i* is used?

A. It is a representation.

X Q. 57. Is not the model No. 6 a representation of the machine which he describes and represents as the machine for forming hat bodies?

A. It is a representation of the machine which he says he generally uses.

781 X Q. 58. Does he describe and represent the construction of any machine for forming hat bodies other than the one represented by model No. 6?

A. He does not limit the operation of No. 6 to the formation of hat bodies, but says other irregular forms may be formed thereon.

(Answer objected to, as not being responsive to the question, and the witness is requested to answer the questions without argument, as plaintiff's counsel, with a view not to exclude his testi-
782 mony, consented that he might be cross-examined within the time allotted by stipulation to the plaintiff to rebut the defendant's case.)

X Q. 59. Question repeated.

A. He does not describe the construction of any other completely organized machine for the forming of hat bodies, than that represented by model 6.

X Q. 60. After describing the machine represented by model No. 7, and after making the remarks which you have quoted in a former answer, does the specification state that when other
783 formers are to be substituted for cylinder *i*, such other form is to be connected with the exhaust in any other manner than as cylinder *i* is connected?

A. It does not state any specific manner, nor any specific change that is to be made in the connection with the exhaust.

X Q. 61. In model No. 7, do not the currents of air induced by the exhaust pass inwards through the pervious surface of the cylin-

der on one side of the axis, and outwards from inside the
784 cylinder on the other side of the axis?

A. They do, in consequence of the enclosures by which cylinder *i* is surrounded.

X Q. 62. Suppose all the surrounding casing or enclosures were removed, how then would the exhaust operate on such cylinders?

A. It would not operate at all on such cylinders, but it was upon the removal of such cylinder that the enclosures were to
785 be removed, as stated in the specification before referred to.

X Q. 63. Do you find in the machine represented by model No. 6, that a sheet of fur fibres approaches the cone in a plane parallel, or nearly parallel, with its axis?

A. No, I do not find it does.

X Q. 64. Could a hat body be formed in a machine like model No. 6, with the thickness of the bat varying in thickness from the brim to the tip, at the will of the operator?

A. I never tried the experiment, and therefore cannot
786 say positively, but I think that as the disintegrating apparatus appears to be quite wide opposite to the cone, that, assuming that fur fed on each side of the feed-apron would be carried through the carding engine, and blown from the fan in the same line in which it was fed, I think from the position of the cone, when placed nearest to the fan, more fibres might be gathered at the base of the cone than at the tip, and therefore the operator might regulate the feed so as to deposit a greater or less quantity upon the base of the cone than at the tip; but I do not think
787 of any other way by which it might be done.

X Q. 65. Do you find in the said specification any description of the mode of regulating the thickness of the bat named in your last answer?

A. I do not.

X Q. 66. You have testified that the distinguishing feature of the Wells invention, in the reissue of October 7, 1856, consists in wrapping the bat with damp cloths while on the exhausted cone, and before placing the perforated cap or cover thereon, and
788 the additional fact, that the water in which the bat is immersed does not contain or is not purposely impregnated with any other substance; have you formed this opinion from any definition of the Wells invention, as described in the said reissued patent?

A. The answer to interrogatory 8, quoted, was made in response to a question calling for my opinion as to what distinguished the said invention of Wells from others, and was not made with reference to the statement of the invention in the patent, but
789 was made from a comparison with the mode of hardening described by Williams.

X Q. 67. In which of Williams' descriptions?

A. The description contained in the application for American letters patent.

X Q. 68. Does not Williams, in that description, state that his invention is "a new method of combining, by means of machinery and adhesive compositions, all kinds of fibrous materials, such as cotton, silk, flax, hemp, tow, fur, wool, hair," etc.?

790 A. He does.

X Q. 69. Could felt hats be made of fibres of cotton, silk, flax, hemp, or tow?

A. I don't think they could.

X Q. 70. Do you find in the said description of Williams any reference whatever of articles to be formed for being felted until you came to the following passage: "If the forms for hat-bodies are required for felting, they are removed to another machine, where they undergo the process of basoning or hardening

791 whilst between the forms?"

A. I do not see any such description.

X Q. 71. Do you find it stated, that the forms to be felted are at any time to be saturated with an adhesive mixture?

A. I do find reference in the said application to figure 7, and afterwards a statement that bats, to be enclosed in such forms as are represented in that drawing, may be felted; and I find that such forms are adapted to forming bats, such as are gener-

792 ally felted and required to be felted before making into hats; and I also find that such forms enclosing bats are to be dipped in a solution of weak size, and I have no doubt that after coming out of that solution of weak size they might be further hardened and felted.

(Answer objected to as not being responsive.)

X Q. 72. Question repeated.

A. I do not find it so stated in specific language.

X Q. 73. Do you not find it stated that after the bat with an outer form, such as is represented in figure 7, the whole is

793 removed together and dipped into a composition of weak size or a solution of shellac which saturates it, and that the material thus combined is taken from the forms and dried? Do you find any description in the connection that they are to be otherwise treated before being dried?

A. I do find that after the isolated phrase, "the material thus combined is taken from the forms and dried," which succeeds the description of the process of saturation, the following: "If the forms for hat bodies are required for felting, they are removed to another machine," etc.

794 X Q. 74. On your oath and conscience, do you believe that the statement which refers to the basoning or hardening of such forms is to be performed on them after they have been saturated with the adhesive mixture?

A. I have been testifying under oath, and my conscience, of

course, was included in that oath, and I have endeavored to state what I think and see is conveyed by the language of the patent, and I have no other means of knowing what was intended by the inventor, who caused the same to be written.

795 X Q. 75. Have you ever known a bat of fur fibres to be saturated with a solution of shellac before being felted and sized? and if yea, state when and where you have seen such thing done.

A. I never have.

F. C. TREADWELL, Jr.

796 Sworn to before me this 17th day of October, 1857.

R. E. STILWELL,
U. S. Com'r.

UNITED STATES OF AMERICA,
Southern District of New York,
City, County, and State of New York, ss.

797 Be it remembered, that on this fifteenth day of October, in the year of our Lord one thousand eight hundred and fifty-seven, I, Kenneth G. White, a commissioner, duly appointed by the circuit court of the United States, for the southern district of New York, in the second circuit, under and by virtue of the acts of Congress entitled "An act for the more convenient taking of affidavits and bail in civil causes depending in the courts of the United States," passed February 20th, 1812, and the act of Congress entitled "An act in addition to an act entitled 'An act for the more convenient taking of affidavits and bail in civil causes
798 depending in the courts of the United States,'" passed March 1st, 1817, and the act entitled "An act to establish the judicial courts of the United States," passed September 24th, 1789, did call and cause to be and personally appear before me, at my office, No. 9 College Place, in the city of New York, in the said southern district of New York, in the State aforesaid, Joseph Burroughs, to testify and the truth to say, on the part and behalf of the defendants, in a certain suit or matter of controversy, now de-
799 pending and undetermined, in the circuit court of the United States for the district of Connecticut, wherein Henry A. Burr, Albert H. Wright, and James M. Riblet are complainants, and George E. Cowperthwaite and Alva B. Taylor are defendants.

And the said Joseph Burroughs being about the age of 58 years, and having been by me first cautioned and sworn to testify the truth, the whole truth, and nothing but the truth, in the matter of controversy aforesaid, I did carefully examine the said Joseph Burroughs, and he did thereupon depose, testify, and say as
800 follows, viz:

Q. 1. What is your name, age, residence, and occupation?

A. Joseph Burroughs; I am 58 years old; my occupation is a hatter by trade; I have been engaged in and acquainted with cutting and fur blowing 25 years; I reside in Newark, New Jersey.

Q. 2. Are you acquainted with the fur-blowing machine of Isaac Searles? and if so, please examine the model now
801 shown you, marked Exhibit No. 9, and state how the same compares with the machine as used by Isaac Searles, and state how long ago it was first used by him.

A. I was. This model is the same as the machine he used, as far as my memory serves me, only that the machine was driven by the foot, acting on a treadle, as near as memory serves me, between 33 and 35 years.

Q. 3. Do you know of his selling any of those machines?

A. Yes, sir, he sold them all over the country.

802 Q. 4. Into what did the mouth of the trunk-piece over the picker discharge?

A. It discharged into the room which he had built for the purpose, and the mouth-piece discharged right up against it.

Cross-examination.

X Q. 5. You never saw one of these machines used for
803 making hat bodies on a cone, did you?

A. No, sir.

JOSEPH BURROUGHS.

Subscribed and sworn to before me this 15th day of October, 1857.

804 KENNETH G. WHITE,
U. S. Com'r.

DISTRICT OF CONNECTICUT, *ss.*

At a circuit court of the United States of America, holden at New Haven, within and for the district of Connecticut, on the fourth Tuesday of April, A. D. 1858.

Present, Honorable Charles A. Ingersoll, district judge.

H. A. BURR, ALBERT H. WRIGHT, JAMES M. RIBLET, vs. GEORGE E. COWPERTHWAITE. } In Equity.

This cause having been fully heard upon the allegations of the parties in their respective pleadings set forth, and upon the proofs and exhibits adduced and argued by counsel, came by due continuance to the present term of this court; and thereupon, upon consideration thereof, and of the several orders heretofore made in the cause, this court doth find that the machines and process used by the defendant are substantially different from the invention,

machines and process, of which the exclusive right is secured by patents found by the court to be valid, to the complainants, as set forth in their bill; and that the defendant, by the use of his said machines and process, does not infringe the rights of the complainants secured as aforesaid. It is, therefore, ordered, adjudged and decreed, that the complainants' bill be dismissed, and that the injunction and orders heretofore granted and made, restraining the defendant from the further use of his said machines and process, or obliging him to render an account thereof, be and the same are hereby dissolved and set aside; and that the defendant recover his costs to be taxed, and that execution issue therefor.

CHS. A. INGERSOLL.

DISTRICT OF CONNECTICUT, *ss.*

May 4th, 1858.

H. A. BURR et als.
vs.
GEORGE E. COWPERTHWAITE. } In Equity.

The complainants in said cause appeal from the final decree of this court to the Supreme Court of the United States of America, next to be holden at Washington, in the District of Columbia, on the first Monday of December, 1858, and Ralph J. Ingersoll, Esq., of said New Haven, having filed his bond in the sum of two hundred dollars, payable to the adverse party, conditioned that the appellants shall prosecute their appeal to effect, and answer all damages and costs if they fail to make their plea and appeal good, the said appeal is therefore allowed.

CHAS. J. INGERSOLL.

U. S. Circuit Ct.—April T., 1858.

HENRY A. BURR, &c.,
vs.
COWPERTHWAITE et al.

Know all men by these presents, that I, Ralph J. Ingersoll, of New Haven, am holden unto the defendants in the above entitled cause, in the sum of two hundred dollars; to the payment of which sum I do hereby firmly bind myself, my heirs, executors and administrators, firmly by these presents.

The condition of this obligation is such, that whereas the plaintiffs in the above entitled cause have appealed from the final decree therein of the U. S. circuit court, in and for the district of Connecticut, at its April term, 1858, to the Supreme Court of the United States; now, therefore, if the said appellants shall prosecute their said appeal to effect, and answer all damages and costs if they fail to make their plea good, then this obligation is to be void; otherwise to be and remain in full force.

Dated at New Haven this 4th day of May, 1858.

R. J. INGERSOLL. [L. S.]